HAMPTON ROADS TRANSIT

U.S. Department of Transportation
Federal Transit Administration

Draft Environmental Impact Statement

VIRGINIA BEACH TRANSIT EXTENSION STUDY

Appendix M

Wetland Identification Technical Report

February 2015

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1 Introduction

1.1. Project History

In 2008, the Virginia General Assembly passed House Bill 6028, directing Hampton Roads Transit (HRT) to study the expansion of The Tide (HRT's Light Rail Transit System in Norfolk) eastward to the Virginia Beach oceanfront. In compliance with this legislation, the Virginia Beach Transit Extension Study (VBTES) was initiated as the first step required for the Federal Transit Administration's (FTA) New Starts Program, a competitive federal grant program that may fund construction of the transit extension.

A Draft Environmental Impact Statement (DEIS) has been prepared for the VBTES. The DEIS outlines the proposed purpose and need for the project and examines broad and specific environmental impacts as required by the National Environmental Policy Act (NEPA) process. The DEIS looks at impacts including, but not limited to, physical and natural, social, cultural, and economic.

HRT retained HDR, Inc. as the prime engineering and planning firm to research and conduct the overall study. Fitzgerald & Halliday, Inc. (FHI), as a subcontractor to HDR, Inc., investigated and documented existing wetland resources in the VBTES Corridor. The initial field investigation of the VBTES Corridor was conducted in 2009. After completion of the fieldwork, the proposed project was placed on hold. In 2013, the project moved forward and fieldwork was again undertaken. At that time, the boundaries and characteristics of wetlands that were investigated in 2009 were reconfirmed in the field and adjustments were made as appropriate based on the current conditions. In 2013, an alignment that would run along Laskin Road, as well as potential sites for a Vehicle Storage and Maintenance Facility (VSMF) were considered. After the 2013 field work was finished the project limit of disturbance (LOD) was modified. This modification of the LOD resulted in areas that were not field investigated. A discussion of the areas that were not field investigated is included in Section 4.3.7.

This Wetlands Field Investigation Report presents the study methodology, as well as the results of fieldwork that was conducted to identify, map, and describe wetlands located within the VBTES Corridor. The field investigation efforts were intended to assist project planning by identifying wetlands within the VBTES Corridor, as a basis for estimating the magnitude of potential project impacts for the DEIS. The field investigation results have been, and will continue to be, used by project engineers and planners as they refine the project alternatives and seek ways to avoid and/or minimize impacts to wetlands to the greatest extent possible. The field investigation informed the VBTES relative to how many wetlands are in the VBTES Corridor, their locations, and their characteristics. Additional field survey will be required for a Jurisdictional Determination (JD) from the Army Corps of Engineers (USACE).

1.2. Proposed Transit Service

The VBTES project involves assessing the environmental impact of various transit alternatives including bus, bus rapid transit (BRT), and light rail transit (LRT) from the eastern end of The Tide at Newtown Road easterly to the Virginia Beach oceanfront. The VBTES Corridor includes alternative routes, station locations, and a potential site for the LRT/BRT VSMF.

The VBTES is considering four potential alternative alignments. Alternative 1A is the shortest alternative, running between The Tide's Newtown Road Station and Town Center (Constitution Drive) on the former Norfolk Southern railroad (NSRR) right-of-way (ROW). Alternative 1B follows the NSRR ROW from the Newtown Road Station east to Rosemont Station. Alternative 2 follows the former NSRR ROW from Newtown Road Station east to Birdneck Road where it turns north and then travels on 17th Street and

19th Street to the Oceanfront. Alternative 3 follows the former NSRR ROW east from Newtown Road Station to Laskin Road. It then follows Laskin Road east to Birdneck Road, south to 19th Street, and east to the Oceanfront. These alternative alignments are discussed in greater detail in the DEIS. A series of transit stations would be developed along the alignment, many with Park & Ride lots. Other elements of construction associated with the project include replacement of and/or extension of existing culverts as well as the replacement of existing bridge structures to accommodate track improvements. In addition to the alternative routes and transit stations, the VSMF is proposed for a site north of Naval Air Station (NAS) Oceana.

1.3. VBTES Corridor Conditions

The VBTES Corridor lies within the Tidewater region of the Atlantic Coastal Plain, which has characteristically flat to gently rolling topography. The Corridor falls within the Chesapeake Bay Watershed. In Virginia Beach, three secondary watersheds make up the Chesapeake Bay primary watershed: the Elizabeth River, Little Creek, and Lynnhaven River. Of these watersheds, the Elizabeth River and Lynnhaven Creek watersheds encompass the VBTES Corridor. The VBTES Corridor also runs through the northern limits of the Rudee Inlet/Owls Creek Watershed; however there are no water bodies within this portion of the Corridor. During heavy rain events, the generally flat topography and low elevation in relation to sea level impedes stormwater runoff, thereby creating inundated conditions within and adjacent to the VBTES Corridor. According to Natural Resource Conservation Service (NRCS) geographic information systems (GIS) soils data (see figure in Appendix A), most of the undeveloped land area in the VBTES Corridor is underlain by hydric soils. This is due to the seasonally high water table and a lack of natural surface drainage resulting from the flat topographic conditions.

For the purpose of the DEIS and this report, the VBTES Corridor is broken down into five segments and the LRT/BRT VSMF. The Newtown Road Station to Town Center segment incorporates the former NSRR ROW from The Tide's Newtown Road Station to the proposed Town Center Station. There are no major water crossings in this segment. The Town Center Station to Rosemont Station segment incorporates the former NSRR ROW from the proposed Town Center Station to the proposed Rosemont Station. The only major water crossing in this segment is Thalia Creek. The Rosemont Station to London Bridge Creek segment also is also entirely within the former NSRR ROW. Water crossings in this segment include Pinetree Branch and London Bridge Creek. The London Bridge Creek to Oceanfront via NSSR ROW – Birdneck Road – 17th Street – 19th Street segment includes the former NSRR ROW and city streets. The only water crossing in this segment is Great Neck Creek. The London Bridge Creek to Oceanfront via Laskin Road – Birdneck Road – 19th Street segment follows city roads. The only water crossing in this segment is Upper Linkhorn Bay. The proposed site of the LRT/BRT VSMF is located on the north side of Potters Road and the NSRR ROW, north of NAS Oceana. The site is within an area that is currently being utilized by the City of Virginia Beach for storage of sediment and debris from road cleaning and storm events.

2 Legal and Regulatory Context

2.1. Federal Regulations

The Army Corps of Engineers (USACE) is the federal agency that regulates wetlands under the Clean Water Act (CWA) of 1972 (33 USC§ 1251 et seq.). They define wetlands based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology as defined in the 1987 USACE Wetland Delineation Manual (TR-Y-87-1). The USACE regulates wetlands associated with hydrologic features connected to interstate waters (e.g., connected to streams that ultimately drain to the Chesapeake Bay). There is no wetland buffer regulated under federal jurisdiction. The USACE has jurisdiction under the CWA to regulate the discharge of dredged or fill material into all waters of the United States including open water, inland wetlands and tidal wetlands. In order to ensure consistency with state wetland and water quality requirements, the issuance of a federal §404 wetland permit by the USACE will be conditional upon issuance of a State Water Quality Certification in accordance with §401 of the CWA.

A Jurisdictional Determination (JD) is a formal letter that is obtained from the USACE stating that they agree with the accuracy of the field delineated wetland boundary and indicating whether they regulate a wetland. A JD expires after five years; however, if the USACE is contacted prior to the expiration date the JD may be extended for another 5 years. A JD from the USACE identifying federally regulated wetlands would be needed in future stages of the project when the proposed activities are better known, and environmental permits are sought for project construction. During the FEIS, when an alternative has been selected and the design has been advanced, the corridor will be field delineated.

2.2. State of Virginia Regulations

The Virginia Department of Environmental Quality (DEQ) regulates activities in state waters and wetlands under Section 401 of the Clean Water Act (33 U.S.C. §1341), under State Water Control Law (Code of Virginia Title 62.1), and Virginia Administrative Code Regulations 9VAC25-210 et seq., 9VAC25-660 et seq., 9VAC25-670 et seq., 9VAC25-680 et seq., and 9VAC25-690 et seq. The DEQ defines wetlands using a definition similar to the USACE and all wetlands that are regulated by the USACE would also be regulated by the DEQ.

The DEQ does regulate some isolated or hydrologically unconnected wetlands; however, they do exclude from regulation certain small, hydrologically isolated wetlands. These excluded wetlands are defined as:

> Isolated wetlands of minimal ecological value which means those wetlands that: (i) do not have a surface water connection to other state waters; (ii) are less than one-tenth of an acre (0.10 acre or 4,356 square feet) in size; (iii) are not located in a Federal Emergency Management Agency designated 100-year floodplain; (iv) are not identified by the Virginia Natural Heritage Program as a rare or state significant natural community; (v) are not forested; and (vi) do not contain listed federal or state threatened or endangered species.

2.3. City of Virginia Beach Regulations

The City of Virginia Beach regulates wetlands as defined in Article 14 (Wetlands Zoning Ordinance) of the City's Zoning Ordinance (City Code Appendix A). Vegetated wetlands are defined in the Wetlands Zoning Ordinance as lands lying between and contiguous to mean low water (MLW) and an elevation above mean low water equal to the factor one and one-half (1½) times the mean tide range upon which is growing tidal marsh vegetation.

The City's Wetlands Board is responsible for reviewing requests for permits for the use, alteration, or development of wetlands, coastal primary sand dunes, and beaches. The Board's jurisdiction for non-vegetated wetlands lies between MLW and mean high water (MHW); and for vegetated wetlands, from MLW to an elevation one and one-half times the mean tide range.

3 Wetlands Field Investigation Methodology

Field investigation of the wetlands in the VBTES Corridor was conducted in 2009 and 2013. The field investigation was supplemented by aerial photo interpretation. The investigation of freshwater wetlands in 2009 was conducted according to the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (USACE, October 2008). Use of this manual became mandatory in January 2009 for all wetland delineations conducted in the District of Columbia as well as the 19 states (including Virginia) that comprise the Atlantic and Gulf Coastal Plain region. The interim regional supplement was finalized in 2010. The 2013 fieldwork was conducted in accordance with Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0) (USACE, November 2010). This approach requires that hydric soils, hydrology, and wetland vegetation be present in order for an area to be classified as a federally regulated wetland. Tidal wetland investigation was conducted based on the estimated elevation of the high tide line and extent of tidal wetland vegetation in accordance with USACE requirements. As the design is progressed in the permitting stage, City of Virginia Beach jurisdictional areas, based on MLW and MHW elevations, would be determined.

FHI's field investigation of wetlands in the VBTES Corridor was initially conducted during the weeks of September 7-11 and November 2-6, 2009, and focused solely on an alternative alignment along the former NSRR ROW. In 2013, an alternative alignment to the Oceanfront through the Hilltop area and locations for the LRT/BRT VSMF were added to the project. Field work was undertaken to identify wetland areas along these new alternative alignments, as well as to verify the boundaries and characteristics of wetlands that were investigated in 2009. Where appropriate, identified wetland boundaries were adjusted based on the 2013 conditions. The 2013 fieldwork was conducted on April 15-19 and September 9-11.

Prior to conducting the field work FHI reviewed existing GIS wetland data and hard-copy maps. Data sources consulted included US Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and Natural Resource Conservation Service (NRCS) soils data (see Appendix A). The wetlands that were identified by FHI during the field work are also included on these figures.

During the fieldwork, FHI field scientists evaluated and noted dominant wetland vegetation, adjacent land uses, hydrologic connections, potential wildlife habitat, and wetland functions and values. Wetland function and values were assessed according to the guidance set forth in the Wetlands Functions and Values: Descriptive Approach described in the September 1999 (NAEEP-360-1-30a) supplement to The Highway Methodology Workbook (Supplement) by the New England Division of the USACE. Field sketches of the wetland boundaries were also developed during the wetlands field investigation.

FHI collected positional data for the wetland flags using a Global Positioning System (GPS) unit with sub-meter accuracy. During the field investigation each wetland was given a unique numeric or alphanumeric label. Some of the individually identified wetland areas are contiguous and form larger wetland systems, such as the wetlands located along the banks of Thalia Creek, London Bridge Creek, Great Neck Creek and Upper Linkhorn Bay. Some wetlands may also extend beyond the immediate VBTES Corridor; however, FHI's wetland field investigation and mapping shows only that portion of the wetland within the limit of disturbance (LOD). The wetland boundary maps depicting the wetlands and their classification using the Cowardin system (Cowardin, et. al., 1979) are included in Appendix B. A USACE JD was not solicited for the DEIS. During the FEIS, when an alternative has been selected and the project design has been advanced an updated wetland delineation will be performed and a JD will be obtained. Wetland boundaries may change based on the updated delineation and JD.

4 Wetland Descriptions and Classifications

Freshwater (Palustrine) wetlands and tidal (Estuarine) wetlands are present within the VBTES Corridor. As defined by the wetland classification system developed by the USFWS (Cowardin et. al., 1979), Palustrine wetland systems include all non-tidal wetlands dominated by trees, shrubs, emergents, mosses, and/or lichens as well as open water areas which do not qualify as lacustrine wetlands. Estuarine wetland systems include deepwater tidal habitats and adjacent tidal wetlands with low energy and salinity greater than 0.5 parts per thousand (ppm), influenced and often semi-enclosed by land.

The characteristics of the wetlands in the VBTES Corridor are described below, and individual wetlands referenced by identification numbers assigned during the field investigation. The locations of the wetlands are shown on mapping included in Appendix B. The wetlands are first discussed by wetland type in Sections 4.1 and 4.2. The wetlands that are within each alignment segment are then discussed in Section 4.3.

4.1. Freshwater Wetlands

Freshwater (Palustrine) wetlands occur throughout the VBTES Corridor and are typically located in undeveloped areas at a lower elevation than the existing rail line or city streets. Because of the low elevation of Virginia Beach in general, slight elevation changes in the landscape often result in the occurrence of wetlands. There are numerous named and unnamed streams and creeks, all of which have associated wetlands. The wetland vegetation classifications (Cowardin et. al. 1979) found in the non-tidal wetlands includes Palustrine Emergent (PEM), Palustrine Scrub-Shrub (PSS), and Palustrine Forested (PFO). The PEM cover type is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. The PSS wetland cover type includes areas that are dominated by saplings and shrubs that typically form a low and compact structure less than 20 feet tall. The PFO wetland cover types are dominated by trees and shrubs that have developed a tolerance to a seasonal high water table. In order to be characterized as forested, a wetland must be dominated by trees and shrubs that are at least 20 feet tall. Forested wetlands typically have a mature tree canopy which can have a broad range of understory and groundcover community components. Some of the wetlands in the VBTES Corridor may contain more than one cover type.

To reflect the function and ecological integrity of the wetlands in the VBTES Corridor, each was categorized by its form and/or position in the landscape. Wetland features typically included isolated depressions, linear depressions, water conveyance systems, water detention areas, and riparian. The characteristics of these categories are described below, as well as the wetlands encompassed by the category and the corresponding wetland vegetation classifications.

4.1.1. Isolated Depressions

Isolated depressions in the VBTES Corridor are typically small, irregularly shaped, low lying areas adjacent to the inactive rail line. These wetlands were formed by unnatural disturbances which result in a localized lowering of the topography and are not hydrologically connected to streams/rivers or other wetlands. The only isolated depression wetland identified in the VBTES Corridor is #79. This wetland is classified as a PEM wetland. This wetland is vegetated with rush (*Juncus spp.*), sedge (*Carex spp*.), mixed wetland grasses (in the family Gramineae), and swamp loosestrife (*Decodon verticillatus*). The primary functions and values of isolated depressions are groundwater recharge and to a lesser degree, sediment/toxicant retention.

4.1.2. Linear Depressions

Linear depressions in the VBTES Corridor are typically long, narrow, low-lying areas that run parallel to the former rail line. These are by far the most common wetland type found in the VBTES Corridor but vary considerably in terms of their length and width. These linear depressions are usually located at the base of the ballast slope of the former NSRR ROW but are also found adjacent to city roads (see Figure 4-1). Because they are frequently the lowest point in the surrounding topographic landscape, they often collect drainage from nearby developed areas.

Predominant vegetation consists of rushes, sedges, mixed wetland grasses, and swamp loosestrife, but often includes a variety of shrubs and trees. As such, the wetland vegetation classifications of these wetlands include PEM, PSS, PFO, or a combination thereof. The vegetation classification of several of the linear depressions changed between the time of the 2009 and 2013 field work due to the cutting and removal of woody vegetation under power line right-of-ways. Evidence of periodic mowing of herbaceous species was also observed in several of the linear depressions. Most of the linear depressions delineated in the VBTES Corridor are not connected to streams or drainageways and are considered hydrologically isolated. The primary functions and values of these linear wetlands are groundwater recharge and sediment/toxicant retention. Wetlands in this category include # 2, 7, 9, 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25A, 25B, 29, 30, 33, 34, 35, 36, 37, 39, 46, 49, 51, 53, 55, 58, 59, 60, 60A, 60B, 61, 62, 63, 65, 70, 71, 80, 81, 82, and 89, along with Wetland E. Figures 4-1 and 4-2 below are representative examples of the numerous linear wetland depressions found along the former NSRR ROW.

Figure 4-1: Linear Wetland Depression #61

***Source*: Fitzgerald & Halliday, Inc., 2013.**

Figure 4-2: Linear Wetland Depression #63

***Source*: Fitzgerald & Halliday, Inc., 2009.**

4.1.3. Water Conveyance Wetlands

Water conveyance wetlands are typically long, narrow, channelized areas that flow parallel to the inactive rail line. These wetlands are usually located just beyond the base of the ballast slope in the former NSRR ROW and are formed by regular drainage and flow patterns along the base of the slope of the rail line. The water conveyance wetlands, unlike most of the linear depression wetlands, are connected to other wetlands or waterways and convey stormwater flows to receiving waters on or off the VBTES Corridor.

Wetland vegetation classifications of these wetlands include PEM, PSS, PFO, or a combination thereof (e.g. when a wetland has distinct areas with different vegetation). Dominant PEM vegetation includes rushes and, sedges. Dominant PFO and PSS vegetation (with tree species appearing as saplings in the PSS wetlands) include sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*). The vegetation classification of several of the water conveyance wetlands changed between the time of the 2009 and 2013 fieldwork due to the cutting and removal of woody vegetation under power line ROWs. Evidence of periodic mowing of herbaceous species was also observed in several of the water conveyance wetlands. The primary functions of these wetlands are groundwater recharge, sediment/toxicant retention, seasonal shellfish habitat (as crayfish burrows were observed), and shoreline stabilization. There are 22 wetlands in this category and include # 1, 3, 5, 6, 8, 10, 13, 24, 25, 26, 27, 28, 45, 49A, 54, 56, 78, 85, 86, 90, Wetland I, and Wetland J. Representative examples of water conveyance system wetlands are depicted in Figures 4-3 and 4-4.

Figure 4-3: Water Conveyance Wetland #90

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-4: Water Conveyance Wetland #45

***Source*: Fitzgerald & Halliday, Inc., 2009.**

4.1.4. Water Detention Areas

Wetlands in the water detention category are typically oblong, depressed areas that are perpendicular to the VBTES Corridor and include constructed stormwater basins. These wetlands typically receive stormwater runoff and other drainage flows from sources beyond the immediate study area, in addition to runoff from the VBTES Corridor. They retain the water in a basin and gradually convey it via culverts to other wetlands or watercourses. Predominant vegetation within these wetlands includes rushes,

sedges, and mixed wetland grasses, often surrounded by trees and shrubs. Because of the range in vegetative cover types, the wetland vegetation classifications of these wetlands include PEM, PSS, PFO, or a combination of these wetland types. Several of the stormwater basins were noted as being vegetated with shrubs during the spring 2013 fieldwork, but the woody vegetation as well as herbaceous vegetation was observed being removed at some basins as part of the periodic maintenance during the fall 2013 fieldwork. The primary functions and values of the water detention wetlands are groundwater recharge, floodflow alteration, sediment/toxicant retention, fish and seasonal shellfish habitat (crayfish burrows were observed). Wetlands in this category include #4, 32 and Wetland F along with the four stormwater basins. Wetlands #4 and #32 are shown in Figures 4-5 and 4-6 below. Stormwater basins SB-1, SB-2 and SB-3 are located south of Parker Lane on the south side of Lowes. Stormwater basin SB-4 is located on the south side of Laskin Road. Wetland #32, Wetland F and the stormwater basins are hydrologically connected to streams. Stormwater basins SB-1 and SB-4 are shown in Figures 4-7 and 4-8 below.

Figure 4-5: Water Detention Wetland #4

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-6: Water Detention Wetland #32

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-7: Stormwater Basin SB-1

***Source*: Fitzgerald & Halliday, Inc., 2013.**

Figure 4-8: Stormwater Basin SB-4

***Source*: Fitzgerald & Halliday, Inc., 2013.**

4.1.5. Riparian

Freshwater riparian wetlands within the VBTES Corridor are typically floodplain areas along a stream or creek. They often form buffers between the stream or creek and an adjacent highly urbanized setting. These wetlands extend beyond the VBTES Corridor, usually connecting to riparian tidal wetlands at some point downstream.

Vegetation in the riparian wetlands ranges from PFO near forested inlands to PEM closer to the streams. Characteristic tree species include sweetgum and red maple. Characteristic PEM vegetation is common reed (*Phragmites australis*). There are also PSS wetlands and wetlands with a combination of vegetation classes. One of the larger riparian wetlands within the VBTES Corridor is Great Neck Creek. This creek flows perpendicular to the VBTES Corridor and through a mix of forest, shrub, and common reed just west of Birdneck Road. It is classified as PFO/PSS/PEM (see Figure 4-10 below). The primary functions of riparian wetlands are groundwater recharge, floodflow alteration, fish and shellfish habitat, and

shoreline stabilization. Wetlands in this category include # 31, 75, 76, 77, 78, 87, and 88. Figures 4-9 and 4-10 below are representative examples of freshwater riparian systems found along the VBTES Corridor.

Figure 4-9: Freshwater Riparian Wetland #88

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-10: Freshwater Riparian Wetland #75

***Source*: Fitzgerald & Halliday, Inc., 2009.**

4.2. Tidal Wetlands

Tidal (Estuarine) wetland systems include deepwater tidal habitats and adjacent tidal wetlands with low energy and salinity greater than 0.5 parts per thousand (ppt) (Cowardin et. al., 1979). The tidal wetlands in the VBTES Corridor occur in association with two tidal creeks crossed by the former NSRR ROW. The two tidal creeks are Thalia Creek that is located east of Independence Boulevard and London Bridge Creek that is located near the Lynnhaven Parkway. Tidal wetlands also occur in association with Laskin Road crossing of Upper Linkhorn Bay. The wetlands are thus riparian in nature, forming linear bands of vegetation along the creeks. The vegetation in these wetlands shows zonation of the low and high marsh, dominated by smooth cordgrass (*Spartina alterniflora*), and saltmeadow cordgrass (*Spartina patens*), respectively. These tidal wetlands are classified as Estuarine Emergent (E2EM), with creek bottoms classified as Estuarine Unconsolidated Bottom (E1UBL). The assessed functions and values of

these wetlands include groundwater recharge, floodflow alteration, fish and shellfish habitat, shoreline stabilization, and aesthetics.

Wetland areas associated with the Thalia Creek are # 38, 40, 43, and 44. Wetlands associated with London Bridge Creek are # 66, 67, 68, and 69. Wetlands associated with Upper Linkhorn Bay are Wetland G and Wetland H. Figures 4-11, 4-12, 4-13 and 4-14 below are representative examples of the tidal wetlands in the VBTES Corridor.

Figure 4-11: Riparian Tidal Wetland #44 (Thalia Creek)

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-12: Thalia Creek Crossing

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-13: Riparian Tidal Wetland #69 (London Bridge Creek)

***Source*: Fitzgerald & Halliday, Inc., 2009.**

Figure 4-14: Upper Linkhorn Bay Crossing

***Source*: Fitzgerald & Halliday, Inc., 2013.**

4.3. Description of Wetlands by Segment

The following provides a description of the wetlands found in each of the five alignment segments within the VBTES Corridor. A description of the proposed site of the LRT/BRT VSMF is also presented in this section. The area, category, NWI classification, dominant vegetation, and functions and values of each wetland are summarized by alignment segment in Tables 4-1, 4-2, 4-3, 4-4, 4-5 and 4-6. For the purpose of the wetlands investigation, the area (acres) of the wetlands within the VBTES Corridor corresponds to the proposed LOD for each alignment segment. Therefore, the area of the wetlands in Tables 4-1, 4-2, 4-3, 4-4, 4.5 and 4-6 only includes the portion of the wetland that is within the LOD. It should also be noted that the LOD was modified after the fieldwork was completed and that there are some areas that were not field investigated. These additional areas are discussed in Section 4.3.7.

4.3.1. Newtown Road Station to Town Center Station along the former NSRR ROW (Alternatives 1A, 1B, 2 and 3)

The Newtown Road Station to Town Center alignment segment incorporates the former NSRR ROW from The Tide's Newtown Station to the Town Center Station at Constitution Drive. More than half (24) of the wetlands in this segment are linear depressions and 12 are water conveyance wetlands. Most of the linear depressions and water conveyance wetlands are vegetated with herbaceous species (PEM) with some also having a shrub component (PSS). Wetland #31 is associated with the non-tidal (riparian) portion of Thalia Creek. Additionally, there is one water detention wetland delineated within this segment.

Table 4-1 Characteristics of Wetlands within the Newtown Road Station to Town Center Segment

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
001	0.214	Water Conveyance Wetland	Yes	PSS/PEM	*Liquidambar styraciflua, Cornus amomum, Decodon verticillatus*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
002	0.026	Linear Depression	No	PEM	*Panicum virgatum*	Groundwater recharge, Sediment/Toxicant retention
003	0.003	Water Conveyance Wetland	Yes	PSS	*Schoenoplectus tabernaemontani, Baccharis halimifolia*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
005	0.065	Water Conveyance Wetland	No	PSS/PEM	*Panicum virgatum, Schoenoplectus tabernaemontani, Salix spp., Baccharis halimifolia*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
006	0.026	Water Conveyance Wetland	Yes	PFO	*Rosa multiflora, Albizia julibrissin, Liquidambar styraciflua*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
007	0.023	Linear Depression	No	PEM	*Juncus spp., Carex spp., Decodon verticillatus, Schoenoplectus tabernaemontani*	Groundwater recharge, Sediment/Toxicant retention
008	0.018	Water Conveyance Wetland	No	PEM	*Juncus spp., Carex spp., Polygonum spp., Decodon verticillatus, Schoenoplectus tabernaemontani, Typha latifolia, Cornus sericea*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
009	0.036	Linear Depression	Yes	PEM	*Juncus spp., Carex spp., Decodon verticillatus*	Groundwater recharge, Sediment/Toxicant retention
010	0.479	Water Conveyance Wetland	No	PSS/PEM	*Panicum virgatum, Salix spp., Morella cerifera*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
011	0.003	Linear Depression	No	PEM	*Juncus spp., Decodon verticillatus, Lonicera japonica*	Groundwater recharge, Sediment/Toxicant retention
012	0.101	Linear Depression	No	PSS/PEM	*Rosa multiflora, Panicum virgatum, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
013	0.240	Water Conveyance Wetland	No	PSS/PEM	*Schoenoplectus tabernaemontani, Salix spp., Liquidambar styraciflua, Morella cerifera, Panicum virgatum*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
014	0.176	Linear Depression	Yes	PEM	*Schoenoplectus tabernaemontani, Symphyotrichum spp., Polygonum spp., Agrostis gigantean*	Groundwater recharge, Sediment/Toxicant retention
015	0.005	Linear Depression	No	PFO	*Liquidambar styraciflua, Smilax rotundifolia, Lonicera japonica*	Groundwater recharge, Sediment/Toxicant retention
016	0.046	Linear Depression	Yes	PEM	*Schoenoplectus tabernaemontani, Phragmites australis, Cyperus esculentus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
017	0.180	Linear Depression	No	PFO	*Panicum virgatum, Liquidambar styraciflua, Sassafras albidum, Acer rubrum*	Groundwater recharge, Sediment/Toxicant retention
018	0.005	Linear Depression	Yes	PEM	*Schoenoplectus tabernaemontani, Cyperus esculentus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
019	0.025	Linear Depression	No	PEM	*Verbena hastata, Carex spp., Juncus spp., Panicum virgatum, Agrostis gigantean*	Groundwater recharge, Sediment/Toxicant retention
020	0.015	Linear Depression	No	PEM	*Panicum virgatum, Verbena hastata, Juncus spp., Carex spp.*	Groundwater recharge, Sediment/Toxicant retention
021	0.026	Linear Depression	No	PEM	*Juncus spp., Carex spp., Apocynum cannabinum, Polygonum spp., Symphyotrichum spp.*	Groundwater recharge, Sediment/Toxicant retention
022	0.016	Linear Depression	Yes	PEM	*Panicum virgatum, Cornus sericea*	Groundwater recharge, Sediment/Toxicant retention
023	0.007	Linear	No	PEM	*Panicum virgatum,*	Groundwater recharge,

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
		Depression			*Agrostis gigantean*	Sediment/Toxicant retention
024	0.305	Water Conveyance Wetland	No	PEM	*Polygonum spp.*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
025	0.079	Water Conveyance Wetland	No	PEM	*Typha latifolia, Polygonum spp.*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
025A	0.020	Linear Depression	Yes	PEM	*Polygonum spp.*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
025B	0.013	Linear Depression	Yes	PEM	*Polygonum spp.*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
026	0.287	Water Conveyance Wetland	No	PSS/PEM	*Lonicera japonica, Baccharis halimifolia, Morella cerifera, Polygonum pensylvanicum, Echinochloa walteri*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
027	0.270	Water Conveyance Wetland	No	PEM	*Polygonum pensylvanicum, Echinochloa walteri*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
028	0.175	Water Conveyance Wetland	No	PEM	*Polygonum pensylvanicum, Echinochloa walteri*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
029	0.087	Linear Depression	Yes	PSS/PEM	*Salix spp., Lonicera japonica, Schoenoplectus tabernaemontani*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat
030	0.056	Linear Depression	No	PSS/PEM	*Lonicera japonica, Liquidambar styraciflua, Acer rubrum, Schoenoplectus tabernaemontani, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
031	0.150	Riparian (Thalia Creek)	Yes	PSS/PEM	*Albizia julibrissin, Liquidambar styraciflua Baccharis halimifolia, Morella cerifera, Polygonum spp., Panicum virgatum*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
032	0.124	Water Detention Area	Yes	PEM	*Carex spp., Polygonum spp.*	Groundwater recharge, Floodflow alteration, Sediment/Toxicant

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
						retention, Seasonal shellfish habitat
033	0.001	Linear Depression	No	PEM	*Lonicera japonica, Verbena hastata, Rosa multiflora*	Groundwater recharge, Sediment/Toxicant retention
034	0.005	Linear Depression	No	PEM	*Agrostis gigantea, Verbena hastata, Juncus spp.*	Groundwater recharge, Sediment/Toxicant retention
035	0.097	Linear Depression	No	PEM	*Juncus spp., Carex spp., Schoenoplectus tabernaemontani, Panicum virgatum*	Groundwater recharge, Sediment/Toxicant retention
036	0.132	Linear Depression	No	PEM	*Juncus spp., Carex spp., Schoenoplectus tabernaemontani, Panicum virgatum*	Groundwater recharge, Sediment/Toxicant retention
037	0.045	Linear Depression	No	PEM	*Juncus spp., Decodon verticillatus*	Groundwater recharge, Sediment/Toxicant retention

Source: *Fitzgerald & Halliday, Inc. 2009 and 2013*
Notes: [a] Acreage of wetland within the limits of the VBTES Corridor.

4.3.2. Town Center to Rosemont Station along the former NSRR ROW (Alternatives 1B, 2 and 3)

The Town Center to Rosemont Station alignment segment incorporates the former NSRR ROW from the proposed Town Center Station at Constitution Drive to the proposed Rosemont Station. Three of the wetlands in this segment are linear depressions and two are water conveyance wetlands. Most of the linear depressions and water conveyance wetlands are vegetated with herbaceous species (PEM) with some also having a shrub component (PSS). Some of the largest wetlands within this segment are those associated with the tidal (riparian) portion of Thalia Creek (# 38, 40, 43, and 44). Measuring the typical channel width, the creek is approximately 75 feet wide at the former NSRR ROW. There are some wider tidal marsh areas both upstream and downstream, but the area of tidal marsh vegetation immediately at the crossing is relatively narrow. The tidal marsh vegetation consists of native species as well as invasive species such as common reed.

Table 4-2 Characteristics of Wetlands within the Town Center to Rosemont Station Segment

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
038	0.444	Tidal Wetlands (Thalia Creek)	Yes	PEM/PSS/E2EM	*Spartina alterniflora*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
039	0.018	Linear Depression	No	PSS/PEM	*Rorippa palustris, Juncus spp., Juncus spp., Carex spp.*	Groundwater recharge, Sediment/Toxicant retention

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
040	0.163	Tidal Wetlands (Thalia Creek)	No	PEM/PSS/E2EM	*Spartina alterniflora*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
043	0.211	Tidal Wetlands (Thalia Creek)	Yes	E2EM/PEM	*Spartina alterniflora*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
044	0.107	Tidal Wetlands (Thalia Creek)	Yes	E2EM	*Spartina alterniflora*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
045	0.218	Water Conveyance Wetland	Yes	PSS/PEM	*Liquidambar styraciflua, Phragmites australis, Baccharis halimifolia*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
046	0.068	Linear Depression	No	PEM	*Carex spp., Phragmites australis, Juncus spp., Decodon verticillatus, Schoenoplectus tabernaemontani, Typha latifolia, Symphyotrichum spp., Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
049	0.103	Linear Depression	No	PEM	*Carex spp., Juncus spp., Decodon verticillatus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
049A	0.257	Water Conveyance Wetland	Yes	PEM	*Carex spp., Juncus spp., Decodon verticillatus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention

Source: *Fitzgerald & Halliday, Inc. 2009 and 2013*
Notes: [a] Acreage of wetland within the limits of the VBTES Corridor.

4.3.3. Rosemont Station to London Bridge Creek along the former NSRR ROW (Alternatives 2 and 3)

A total of 17 wetlands were delineated in the Rosemont Station to London Bridge Creek segment. For the purposes of this discussion, the entire wetland system associated with London Bridge Creek is discussed in this section. Of these 17 wetlands, 11 are linear depressions and 2 are water conveyance wetlands. Most of the linear depressions and water conveyance wetlands are vegetated with herbaceous species (PEM) although some shrub species are also present in some of the wetlands. The largest wetlands within this alignment segment are the tidal wetlands that are associated with London

Bridge Creek. The width of the creek under the existing railway bridge is about 115 feet due to embankments that extend into the floodplain. Immediately south of the bridge, the creek is about 200 feet wide; immediately north, it is about 150 feet wide. There is a relatively narrow area of native saltmarsh vegetation along the shoreline of London Bridge Creek at the former NSRR ROW crossing.

Table 4-3 Characteristics of Wetlands within the Rosemont Station to London Bridge Creek Segment

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
051	0.019	Linear Depression	No	PEM	*Lonicera japonica, Agrostis gigantea, Polygonum spp., Rorippa palustris*	Groundwater recharge, Sediment/Toxicant retention
053	0.039	Linear Depression	No	PEM	*Schoenoplectus tabernaemontani, Carex spp., Morella pensylvanica, Lonicera japonica*	Groundwater recharge, Sediment/Toxicant retention
054	0.061	Water Conveyance Wetland	Yes	PFO	*Platanus occidentalis, Morella pensylvanica, Polygonum hydropiperoides*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
055	0.148	Linear Depression	No	PEM	*Panicum virgatum*	Groundwater recharge, Sediment/Toxicant retention
056	0.246	Water Conveyance Wetland	No	PSS/PEM	*Panicum virgatum, Phragmites australis, Echinochloa walteri, Morella pensylvanica*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
058	0.036	Linear Depression	No	PSS/PEM	*Carex spp., Juncus spp., Decodon verticillatus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
059	0.206	Linear Depression	Yes	PSS/PEM	*Acer negundo, Panicum virgatum, Phragmites australis, Acer rubrum*	Groundwater recharge, Sediment/Toxicant retention
060A	0.183	Linear Depression	No	PFO/PSS	*Typha latifolia, Acer negundo, Lonicera japonica, Acer rubrum, Arundinaria gigantean*	Groundwater recharge, Sediment/Toxicant retention
060B	0.233	Linear Depression	Yes	PEM	*Typha latifolia, Arundinaria gigantean*	Groundwater recharge, Sediment/Toxicant retention
061	0.227	Linear Depression	No	PEM	*Carex spp., Juncus spp., Decodon verticillatus, Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention
062	0.012	Linear Depression	Yes	PEM	*Carex spp., Juncus spp., Decodon verticillatus*	Groundwater recharge, Sediment/Toxicant retention
063	0.033	Linear Depression	No	PEM	*Schoenoplectus tabernaemontani, Polygonum spp., Carex spp., Juncus spp.*	Groundwater recharge, Sediment/Toxicant retention
065	0.064	Linear Depression	No	PEM	*Typha latifolia, Phragmites australis, Arundinaria gigantea,*	Groundwater recharge, Sediment/Toxicant retention

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
					Panicum virgatum	
066	0.254	Tidal Wetlands (London Bridge Creek)	Yes	E2EM/PEM	*Spartina alterniflora, Spartina patens*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
067	0.143	Tidal Wetlands (London Bridge Creek)	Yes	E2EM	*Spartina alterniflora, Spartina patens, Morella pensylvanica*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
068	0.033	Tidal Wetlands (London Bridge Creek)	Yes	E2EM	*Spartina alterniflora, Spartina patens*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
069	0.312	Tidal Wetlands (London Bridge Creek)	Yes	E2EM	*Spartina alterniflora, Spartina patens*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics

Source: Fitzgerald & Halliday, Inc. 2009 and 2013
Notes: [a] Acreage of wetland within the limits of the VBTES Corridor.

4.3.4. London Bridge Creek to Oceanfront via former NSRR ROW – Birdneck Road – 17th Street – 19th Street (Alternative 2)

A total of 16 wetlands were delineated in the London Bridge Creek to Oceanfront via the former NSSR ROW – Birdneck Road – 17th Street – 19th Street segment. Of these 16 wetlands, 6 are linear depressions, 4 are water conveyance wetlands and 1 is an isolated depression. Most of these wetlands are a combination of forested (PFO) and shrub (PSS) with herbaceous species also being present. Wetland 078 is largest wetland with this alignment segment. This wetland is a riparian wetland that is associated with unnamed streams located to the west and east of the LRT/BRT VSMF. There are also riparian wetlands associated with Great Neck Creek. Forested and emergent (PEM) wetlands containing both native and non-native species border Great Neck Creek at the location of the crossing. The PEM wetlands along Great Neck Creek are dominated by the invasive species common reed. Wetland # 75, 76 and 77 were delineated by the USACE as part of their field delineation of all wetlands on the NAS Oceana property and are therefore federally regulated wetlands.

Table 4-4 Characteristics of Wetlands within the London Bridge Creek to Oceanfront via former NSRR ROW – Birdneck Road – 17th Street – 19th Street Segment

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
070	0.059	Linear Depression	Yes	PFO/PSS	*Robinia pseudoacacia, Acer rubrum, Salix spp., Arundinaria gigantea,*	Groundwater recharge, Sediment/Toxicant retention

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
					Phragmites australis, Morella cerifera	
071	0.121	Linear Depression	No	PSS/PEM	*Acer rubrum, Acer negundo, Robinia pseudoacacia, Typha latifolia, Schoenoplectus tabernaemontani*	Groundwater recharge, Sediment/Toxicant retention
075[b]	0.028	Riparian	Yes	PFO/PSS	*Albizia julibrissin, Acer rubrum, Phragmites australis, Smilax rotundifolia*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat
076[b]	0.004	Riparian	Yes	PFO/PSS	*Acer rubrum, Phragmites australis, Smilax rotundifolia, Morella pensylvanica, Morella cerifera*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat
077[b]	0.023	Riparian	Yes	PFO/PSS	*Albizia julibrissin, Acer rubrum, Phragmites australis, Smilax rotundifolia, Liquidambar styraciflua*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat
078[c]	1.057	Riparian and Water Conveyance Wetland	Yes	PFO/PSS/PEM	*Solidago spp., Morella pensylvanica, Rosa multiflora, Liquidambar styraciflua, Panicum virgatum, Arundinaria gigantea, Acer rubrum,*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
079	0.028	Isolated Depression	Yes	PFO/PSS	*Juncus spp., Carex spp., Schoenoplectus tabernaemontani, Echinochloa walteri, Liquidambar styraciflua, Daucus carota*	Groundwater recharge, Sediment/Toxicant retention
080	0.041	Linear Depression	No	PFO	*Liquidambar styraciflua, Apocynum cannabinum, Salix spp.*	Groundwater recharge, Sediment/Toxicant retention

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
081	0.041	Linear Depression	No	PEM	*Phragmites australis, Rorippa palustris*	Groundwater recharge, Sediment/Toxicant retention
082	0.048	Linear Depression	No	PEM	*Carex spp., Juncus spp.*	Groundwater recharge, Sediment/Toxicant retention
085	0.414	Water Conveyance Wetland	Yes	PFO/PSS	*Phragmites australis, Liquidambar styraciflua, Morella pensylvanica*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
086	0.031	Water Conveyance Wetland	Yes	PFO/PSS	*Phragmites australis, Liquidambar styraciflua, Acer rubrum*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization
087	0.340	Riparian (Great Neck Creek)	Yes	PFO/PSS/PEM	*Phragmites australis, Morella pensylvanica, Acer rubrum*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat
088	0.768	Riparian (Great Neck Creek)	Yes	PEM	*Phragmites australis, Schoenoplectus tabernaemontani, Panicum virgatum*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat
089	0.040	Linear Depression	Yes	PEM	*Panicum virgatum, Juncus spp., Carex spp.*	Groundwater recharge, Sediment/Toxicant retention
090	0.026	Water Conveyance Wetland	Yes	PEM	*Panicum virgatum, Juncus spp., Carex spp., Polygonum spp.*	Groundwater recharge, Sediment/Toxicant retention

Source: *Fitzgerald & Halliday, Inc. 2009 and 2013*
Notes:
[a] Acreage of wetland within the limits of the VBTES Corridor.
[b] Wetland on NAS Oceana that was delineated by the USACE.
[c] The south portion of Wetland 078 is within this alignment segment and the north portion is in the LRT/BRT VSMF.

4.3.5. London Bridge Creek to Oceanfront via Laskin Road – Birdneck Road – 19th Street (Alternative 3)

The London Bridge Creek to Oceanfront via Laskin Road – Birdneck Road – 19th Street segment follows city roads within a highly developed area. A total of 10 wetlands were delineated in this alignment segment of which four are stormwater basins. Of these 10 wetlands, one is a linear depression and two

are water conveyance wetlands. The largest wetlands within this alignment segment are the tidal wetlands that are associated with Upper Linkhorn Bay. The width of the bay is approximately 100 feet wide at the Laskin Road crossing, and it widens out north and south of the bridge. There is a relatively narrow area of saltmarsh vegetation along the shoreline of Upper Linkhorn Bay at the Laskin Road crossing. The tidal marsh vegetation consists of both native species as well as invasive species such as common reed. There are also five water detention areas of which four are constructed stormwater basins (SB-1, SB-2, SB-3 and SB-4).

Table 4-5 Characteristics of Wetlands within the London Bridge Creek to Oceanfront via Laskin Road – Birdneck Road – 19th Street Segment

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
E	0.308	Linear Depression	No	PEM	*Juncus effusus, Typha latifolia*	Groundwater recharge, Sediment/Toxicant retention
F	0.105	Water Detention Area	Yes	PUB/PFO/PSS	*Acer rubrum, Liquidambar styraciflua, Nyssa sylvatica, Clethra alnifolia, Juncus effusus, Decodon verticillatus*	Groundwater recharge, Floodflow alteration, Sediment/Toxicant retention, Wildlife habitat
G	0.021	Tidal Wetlands (Upper Linkhorn Bay)	Yes	E2EM	*Spartina alterniflora, Phragmites australis, Solidago sempervirens, Baccharis halimifolia*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
H	0.218	Tidal Wetlands (Upper Linkhorn Bay)	Yes	E2EM	*Spartina alterniflora, Spartina patens, Phragmites australis, Solidago sempervirens, Baccharis halimifolia*	Groundwater recharge, Floodflow alteration, Fish and shellfish habitat, Shoreline stabilization, Wildlife habitat, Aesthetics
I	0.023	Water Conveyance Wetland	No	PFO	*Liquidambar styraciflua, Juncus effusus*	Groundwater recharge, Sediment/Toxicant retention
J	0.192	Water Conveyance Wetland	Yes	PEM	*Typha latifolia, Juncus effusus, Polygonum sp., Schoenoplectus tabernaemontani, Toxicodendron radicans*	Groundwater recharge, Sediment/Toxicant retention, Fish habitat
SB-1[b]	0.090	Water Detention	No	PUB/PEM	*Typha latifolia, Juncus effusus,*	Groundwater recharge, Floodflow

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
		Area			*Polygonum sp., Schoenoplectus tabernaemontani*	alteration, Sediment/Toxicant retention
SB-2 [b]	0.048	Water Detention Area	No	PUB/PEM	*Typha latifolia, Juncus effusus, Polygonum sp., Schoenoplectus tabernaemontani*	Groundwater recharge, Floodflow alteration, Sediment/Toxicant retention
SB-3 [b]	0.159	Water Detention Area	No	PUB/PEM	*Typha latifolia, Juncus effusus, Polygonum sp., Schoenoplectus tabernaemontani*	Groundwater recharge, Floodflow alteration, Sediment/Toxicant retention
SB-4	0.006	Water Detention Area	Yes	PUB/PEM	*Juncus effusus*	Groundwater recharge, Floodflow alteration, Sediment/Toxicant retention

Source: *Fitzgerald & Halliday, Inc. 2009 and 2013*

Notes: [a] Acreage of wetland within the limits of the VBTES Corridor.

[b] the vegetation within stormwater basins SB-1, SB-2 and SB-3 that are located behind Lowes was being removed as part of maintenance activities during the fall 2013 field investigation

4.3.6. LRT/BRT VSMF (Alternatives 2 and 3)

The proposed LRT/BRT VSMF site is located on property owned by the City of Virginia Beach north of Potters Road between London Bridge Road and First Colonial Road. The LRT/BRT VSMF site is shown in Figures 4-15 and 4-16. The site's prior uses were as a borrow pit for construction of what is now Interstate 264, then later as a landfill for dredged material and temporary storage of storm debris and other materials. The central portion of this site is highly disturbed where the debris and soil are actively being deposited and moved around. One wetland was identified around the east perimeter of this area, consisting of a water conveyance wetland that is a combination of PFO, PSS and PEM wetlands. The southern portion of this wetland extends into the London Bridge Creek to Oceanfront via NSRR ROW – Birdneck Road – 17th Street – 19th Street alignment segment. Approximately 0.17 acres of this wetland (#78) is within the VSMF site. The northern portion of the VSMF site (approximately 20 acres) has not been field investigated. Based on aerial photography investigation, it appears additional wetlands may be present in this area. During the FEIS, when an alternative has been selected and the design has been advanced, the wetland boundaries will be field delineated and a JD obtained.

Figure 4-15: LRT/BRT VSMF Site

***Source*: Fitzgerald & Halliday, Inc., 2013.**

Figure 4-16: LRT/BRT VSMF Site

***Source*: Fitzgerald & Halliday, Inc., 2013.**

Table 4-6 Characteristics of Wetlands within the LRT/BRT VSMF

Wetland ID	Total Wetland Area (ac)[a]	Wetland Category	Continues off Site	NWI Classification	Dominant Vegetation	Functions and Values
078[b]	0.174	Water Conveyance Wetland	Yes	PFO/PSS/PEM	*Solidago spp., Morella pensylvanica, Rosa multiflora, Liquidambar styraciflua, Panicum virgatum, Arundinaria gigantea, Acer rubrum*	Groundwater recharge, Sediment retention, Seasonal shellfish habitat, Shoreline stabilization

Source: *Fitzgerald & Halliday, Inc. 2013*
Notes: [a] Acreage of wetland within the limits of the VBTES Corridor.
[b] The north portion of Wetland 078 is within the LRT/BRT VSMF and the south portion is within the London Bridge Creek to Oceanfront via NSSR ROW – Birdneck Road – 17th Street – 19th Street segment

4.3.7 Areas Not Field Surveyed

After the 2013 field work was finished the project LOD was modified. This modification of the LOD resulted in areas that have not been field investigated. The location, approximate area and land use in the areas not surveyed are summarized in Table 4-7.

Table 4-7 Areas Not Field Surveyed

Location of Area Not Surveyed	Approximate Area (acres)	Description of Area Not Surveyed
Northern portion of LRT/BRT VSMF	20	Area used by City for storage of sediment and road cleaning debris. Woodlands around perimeter.
Area between Potters Road and LRT/BRT VSMF	0.75	Dirt road, woodland and open grassy area
Princess Anne Road Crossing of NSRR ROW	0.05	Paved road
North end of South Lowther Drive, north of NSRR ROW	0.17	Woodland, building, dirt parking area
East of Thalia Creek, north of NSRR ROW	0.08	Woodland, grassy area
North Plaza Trail crossing, north of NSRR ROW	0.30	Paved road, grass median
Intersection of Southern Boulevard and South Birdneck Road	0.11	Residential lot and paved road
West of North Great Neck Road and south of Virginia Beach Boulevard	2.75	Woodland, commercial buildings, parking lot and Virginia Beach Boulevard

Location of Area Not Surveyed	Approximate Area (acres)	Description of Area Not Surveyed
North end of North Birdneck Road, east side	5	commercial buildings, paved road and parking lots
West side of North Birdneck Road, north of Bluebird Drive	0.50	Residential lots
West side of North Birdneck Road	0.9	Parking lot

Source: Fitzgerald & Halliday, Inc. 2013

5 Next Steps

A JD from the USACE is not warranted for the NEPA DEIS since the DEIS is a planning phase and does not require the same level of detail as project permitting. A JD is valid for a period of five years. However, if a request is made to the USACE prior to the five year expiration date the JD may be extended for an additional 5 years. Hence this wetland field investigation was oriented for the purposes of collecting comprehensive data relative to the number and location of wetlands for the DEIS and not documenting each wetland in detail for the purposes of a JD and project permitting.

For the purposes of environmental permitting, a JD will need to be obtained. Its timing should depend upon the schedule for project design and construction, to account for the period of time that the JD is valid for. Future steps necessary for wetland permitting will include the following:

- The JD and permitting process will require delineation of wetlands potentially disturbed by construction of the proposed project, preparation of wetland transect forms and function-value assessments for those impacted wetlands. [Note that plans to the level of conceptual and/or preliminary design will be required to ensure that all impacted areas are covered by the delineation.]
- Perenniality data sheets will need to be completed to clearly document wetland connectivity.
- A Wetland Delineation Report will need to be prepared to document the delineation and detailed descriptions of the impacted wetlands. This will be used in support of the JD and the permit applications.
- Coordination with the USACE to conduct the JD and with the DEQ relative to State regulated wetlands will be required.
- The detailed function-value assessment, in combination with the impact acreage calculations, will form the basis of information for identifying and coordinating wetland mitigation requirements with the USACE and DEQ. At that time, detailed studies of mitigation options can be conducted.
- A mitigation plan will need to be developed and approved by the USACE and DEQ as part of the environmental permitting requirements

6 References

33 U.S.C. 1251 (1972). Section 404 of the Clean Water Act

33 U.S.C §403 (1899). Section 10 of Rivers and Harbors Act of 1899

City of Virginia Beach Regulations, Article 14 (Wetlands Zoning Ordinance)

Code of Virginia, Title 62.1, State Water Control Law

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Virginia Administrative Code Regulations, (9VAC25-660 et seq.), Virginia Water Protection General Permit for Impacts less than One-half an Acre

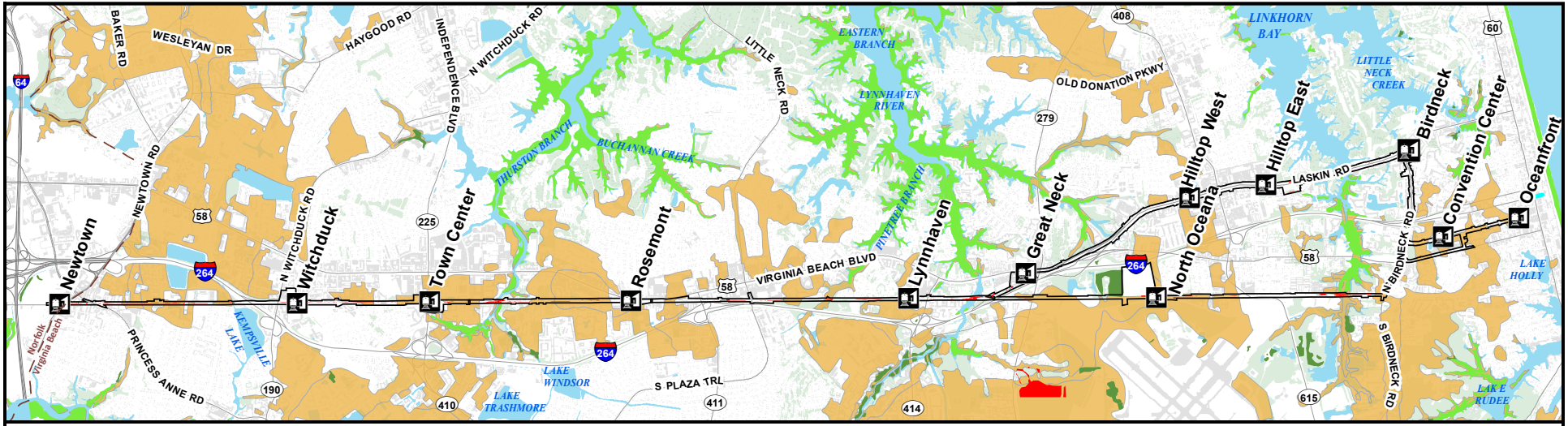
Virginia Administrative Code Regulations, (9VAC25-670 et seq.), Virginia Water Protection General Permit for Facilities and Activities of Utility and Public Service Companies Regulated by the Federal Energy Regulatory Commission of the State Corporation Commission and other Utility Line Activities

Virginia Administrative Code Regulations, (9VAC25-680 et seq.), Virginia Water Protection General Permit for Linear Transportation Projects

Virginia Administrative Code Regulations, (9VAC25-690 et seq.), Virginia Water Protection General Permit for Impacts from Development and Certain Mining Activities

APPENDIX A

NATIONAL WETLANDS INVENTORY/NATURAL RESOURCES CONSERVATION SERVICE DATA MAP



N
W E
S

0 3,000 6,000 Feet

1 inch = 1.25 miles

Legend

- VBTES Alignment
- Surface Water
- Delineated Wetland
- Hydric Soil (NRCS Soil Classification)

National Wetland Inventory:

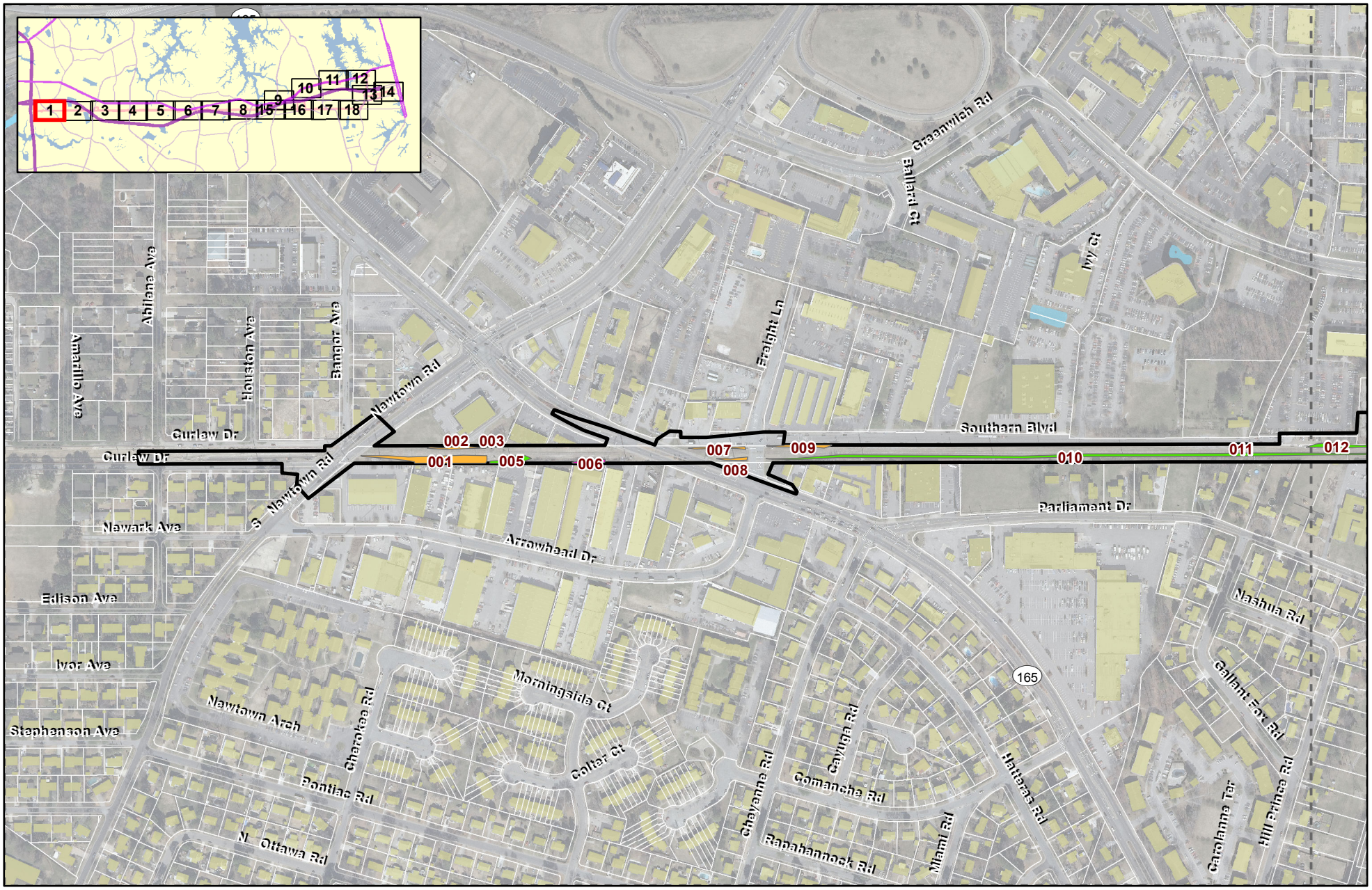
- Estuarine and Marine Wetlands
- Fresh Water Wetland

Virginia Beach Transit Extension Study

Wetland Resources

APPENDIX B

WETLANDS FIELD INVESTIGATION MAPS



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 1

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

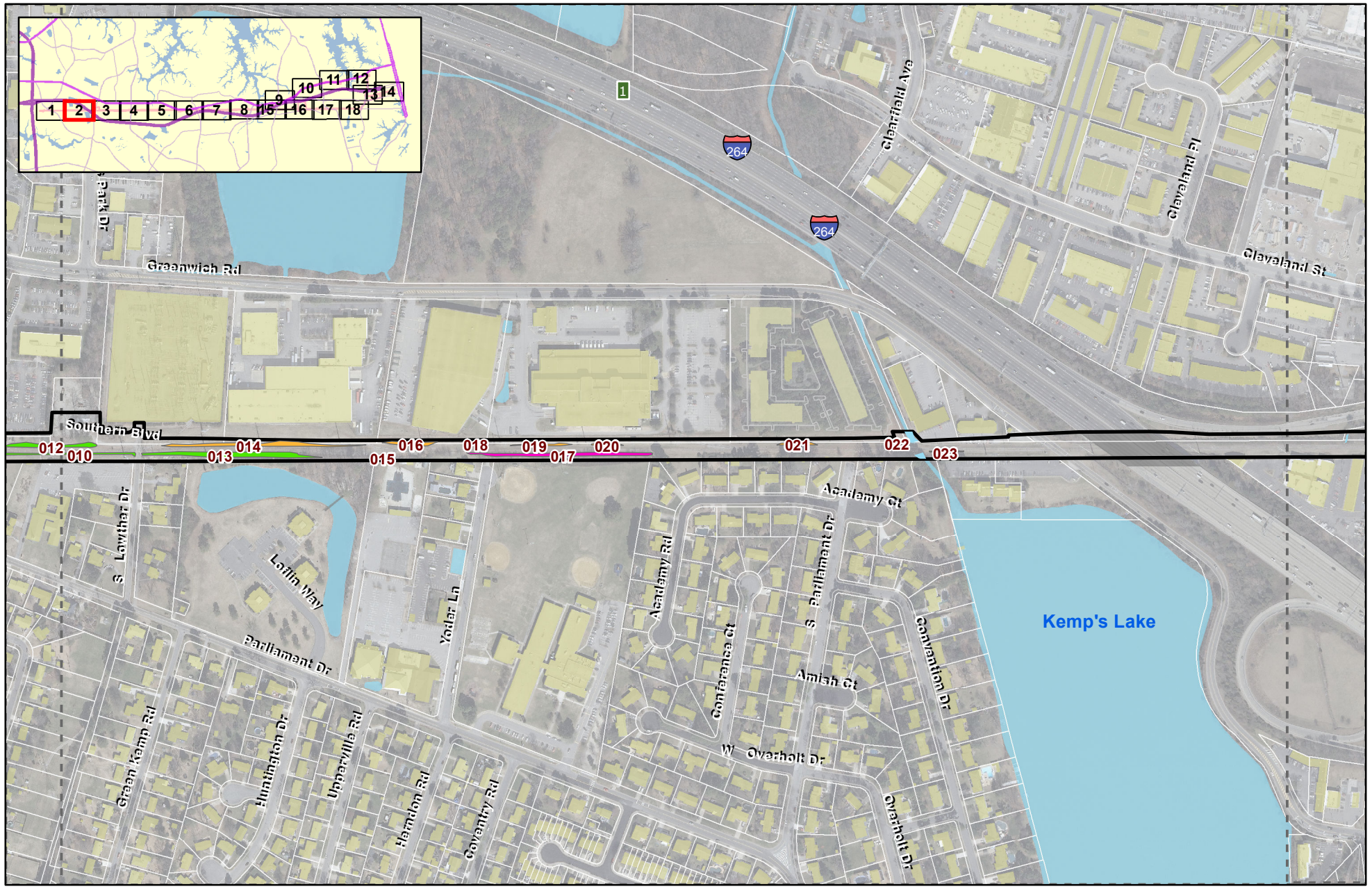
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 2

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

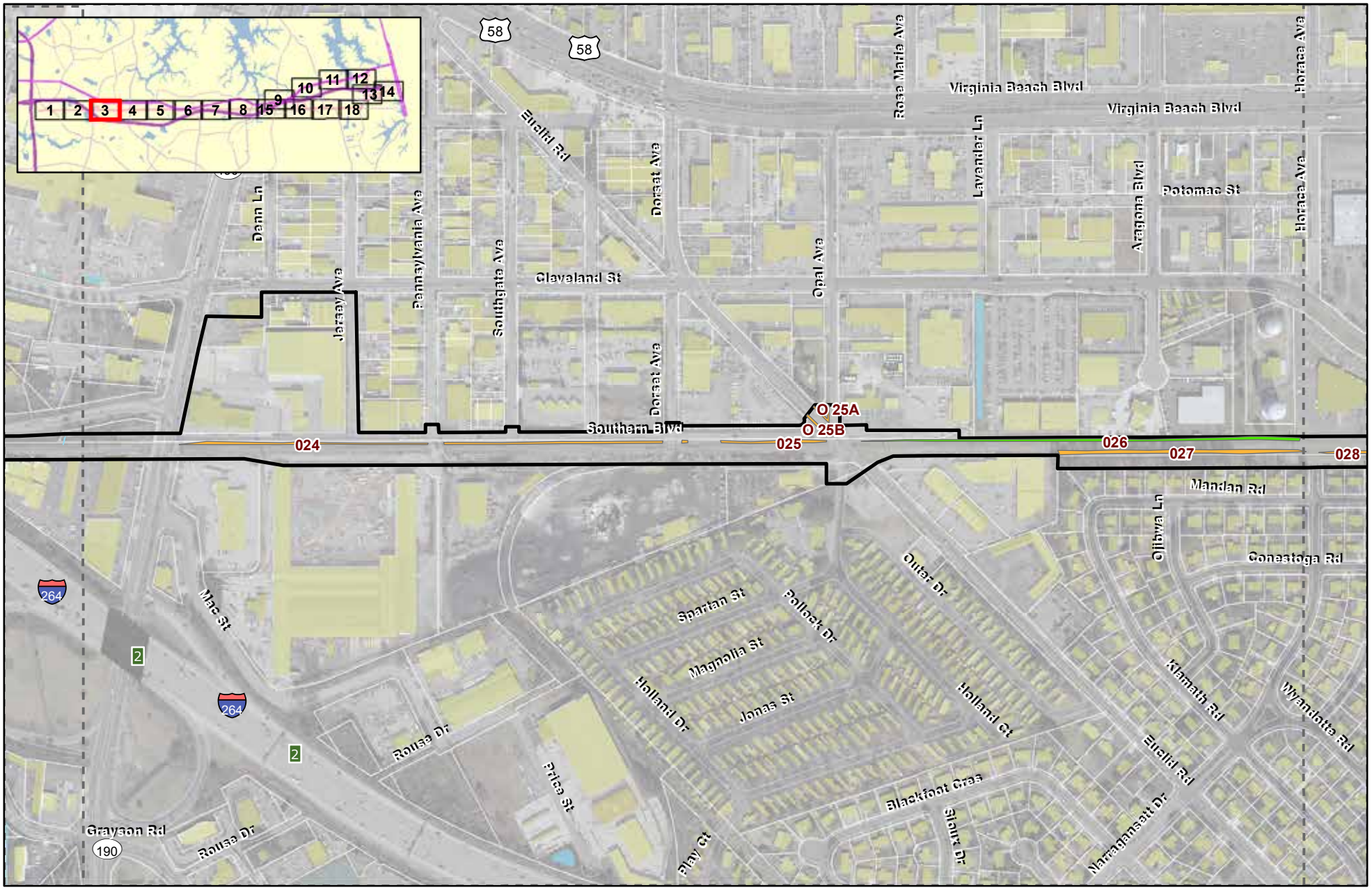
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 3

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

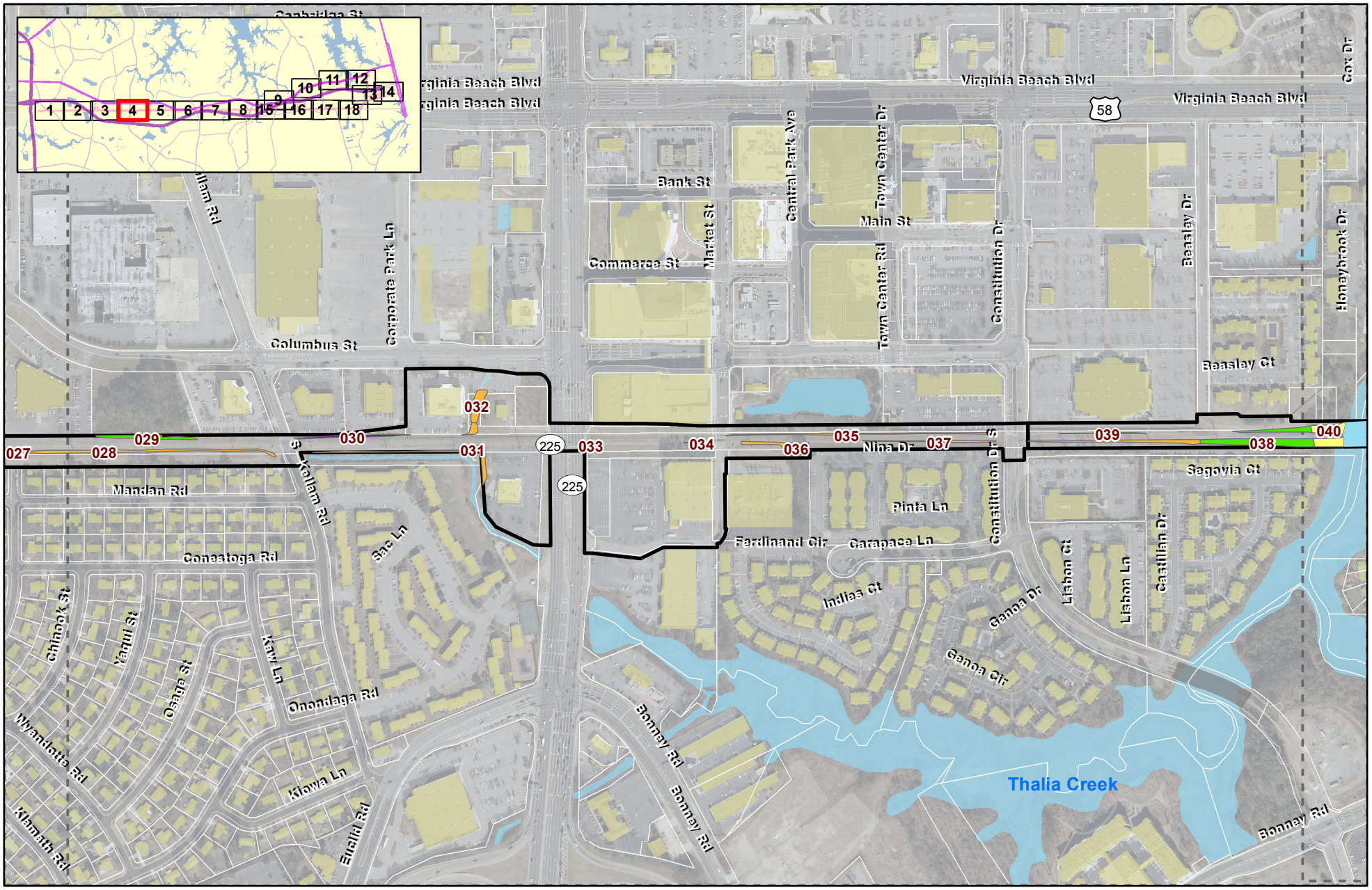
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 4

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

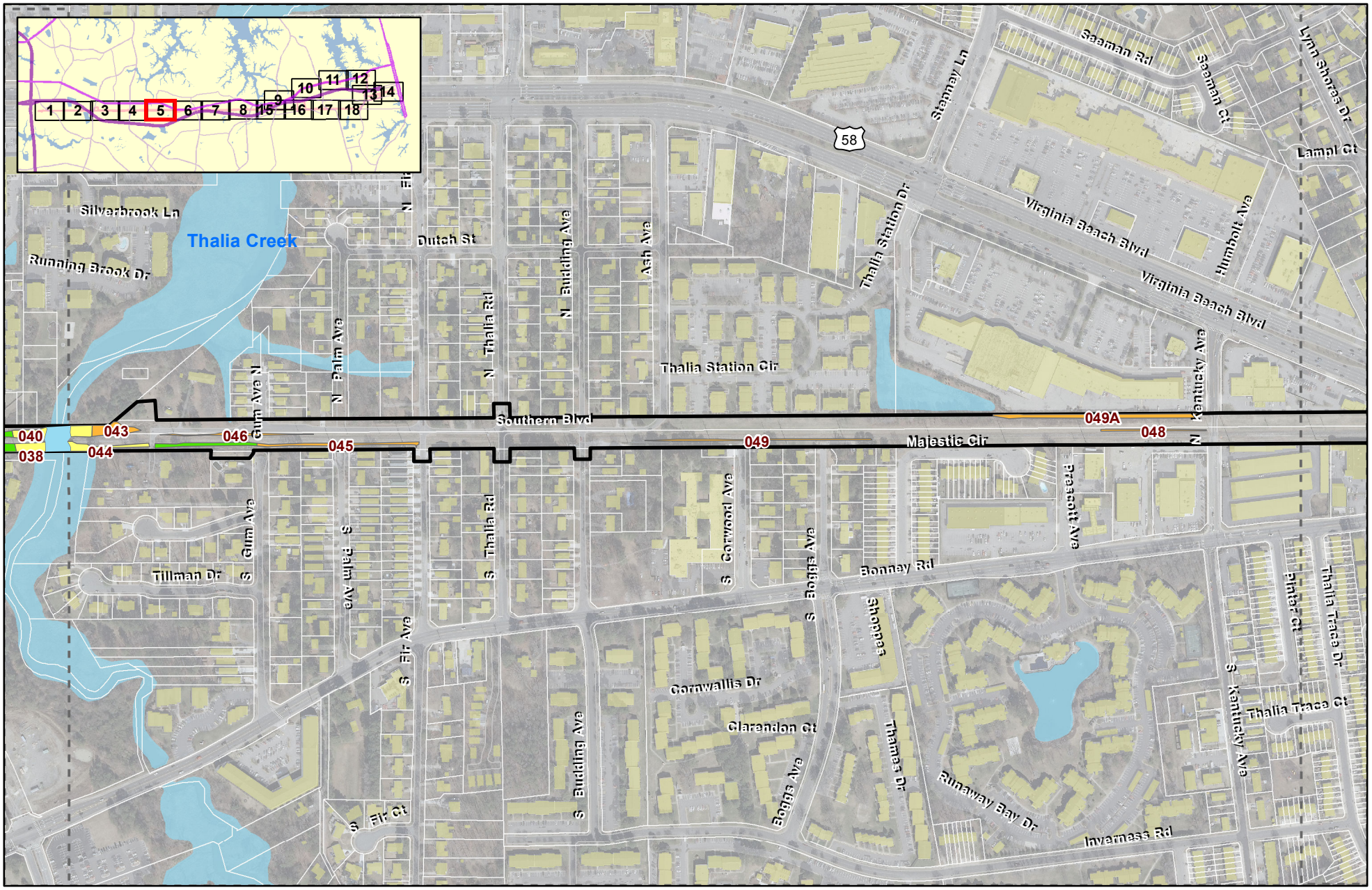
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 5

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

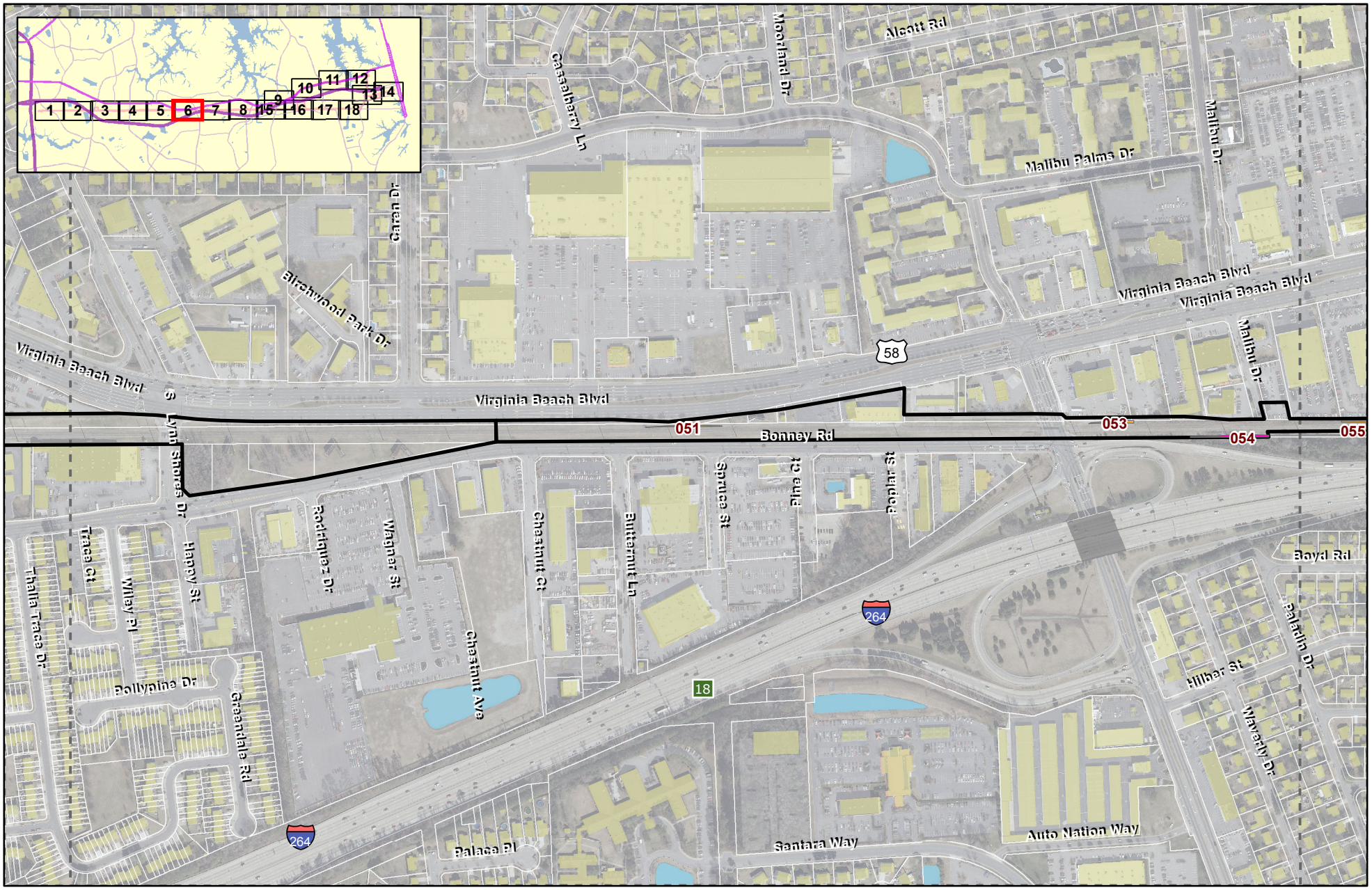
- Limit of Disturbance

Match Line

- Match Line

0 100 200 300 400 Feet

N



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 6

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

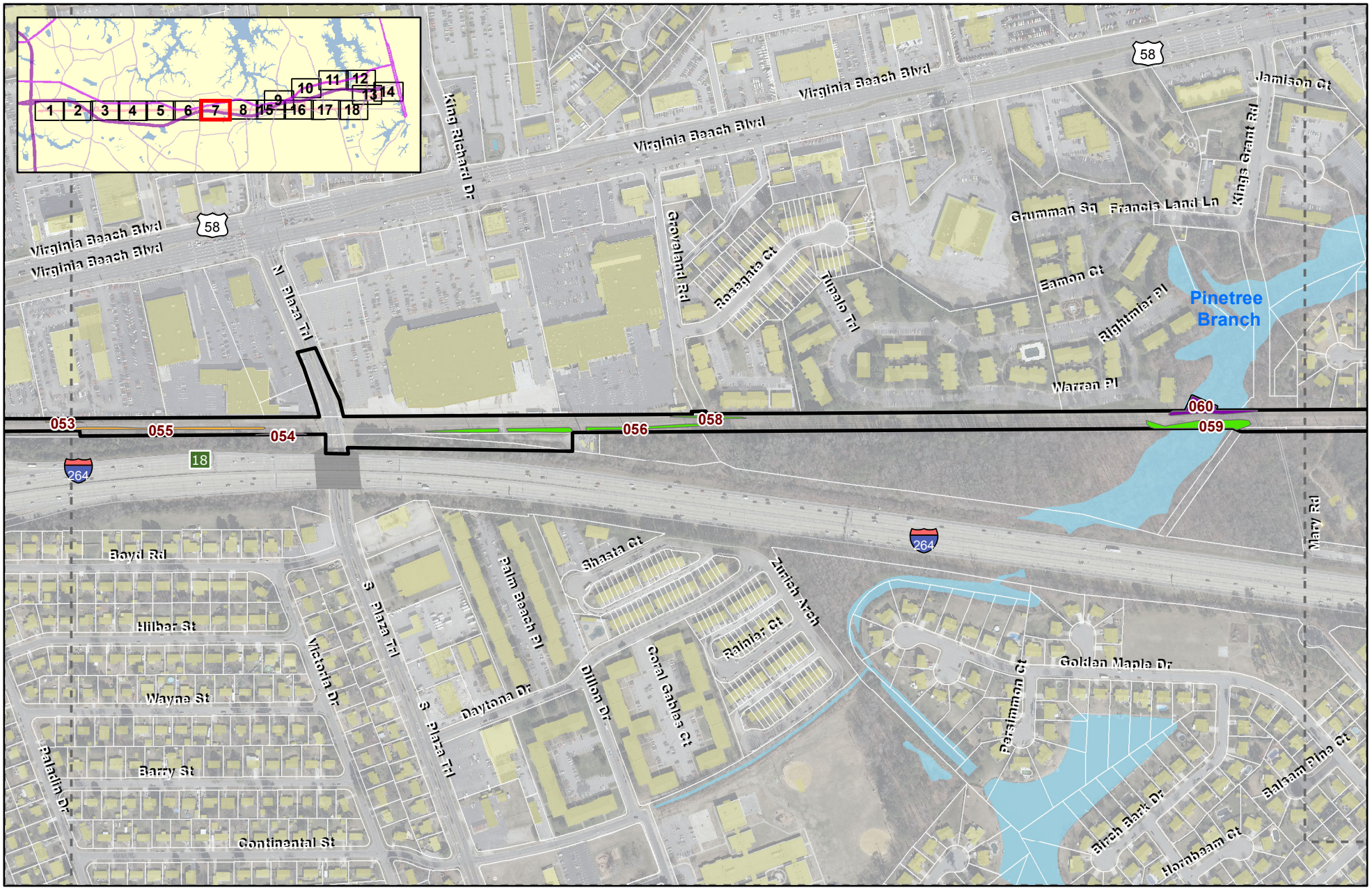
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 7

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

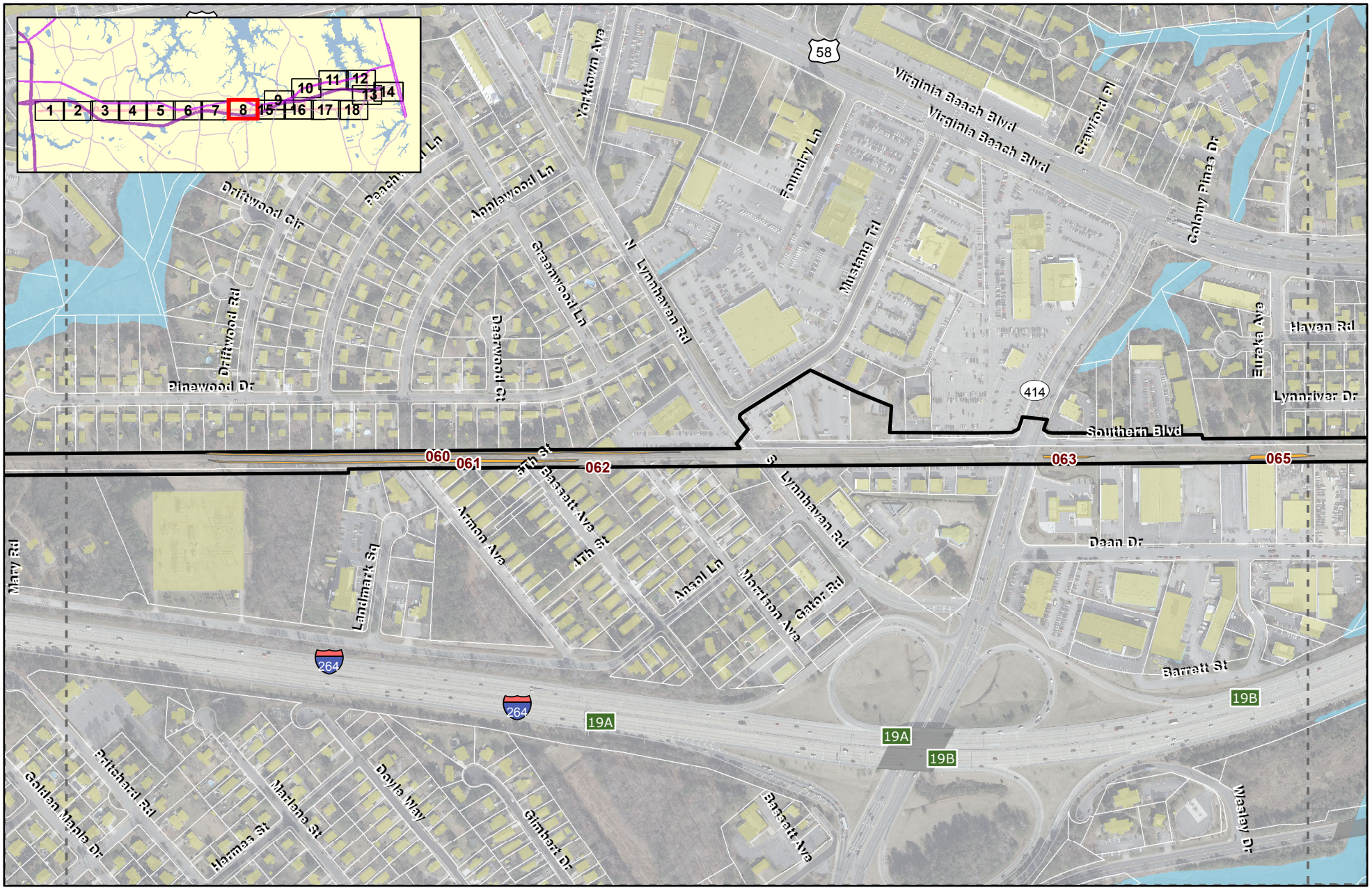
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 8

Cowardin Classification

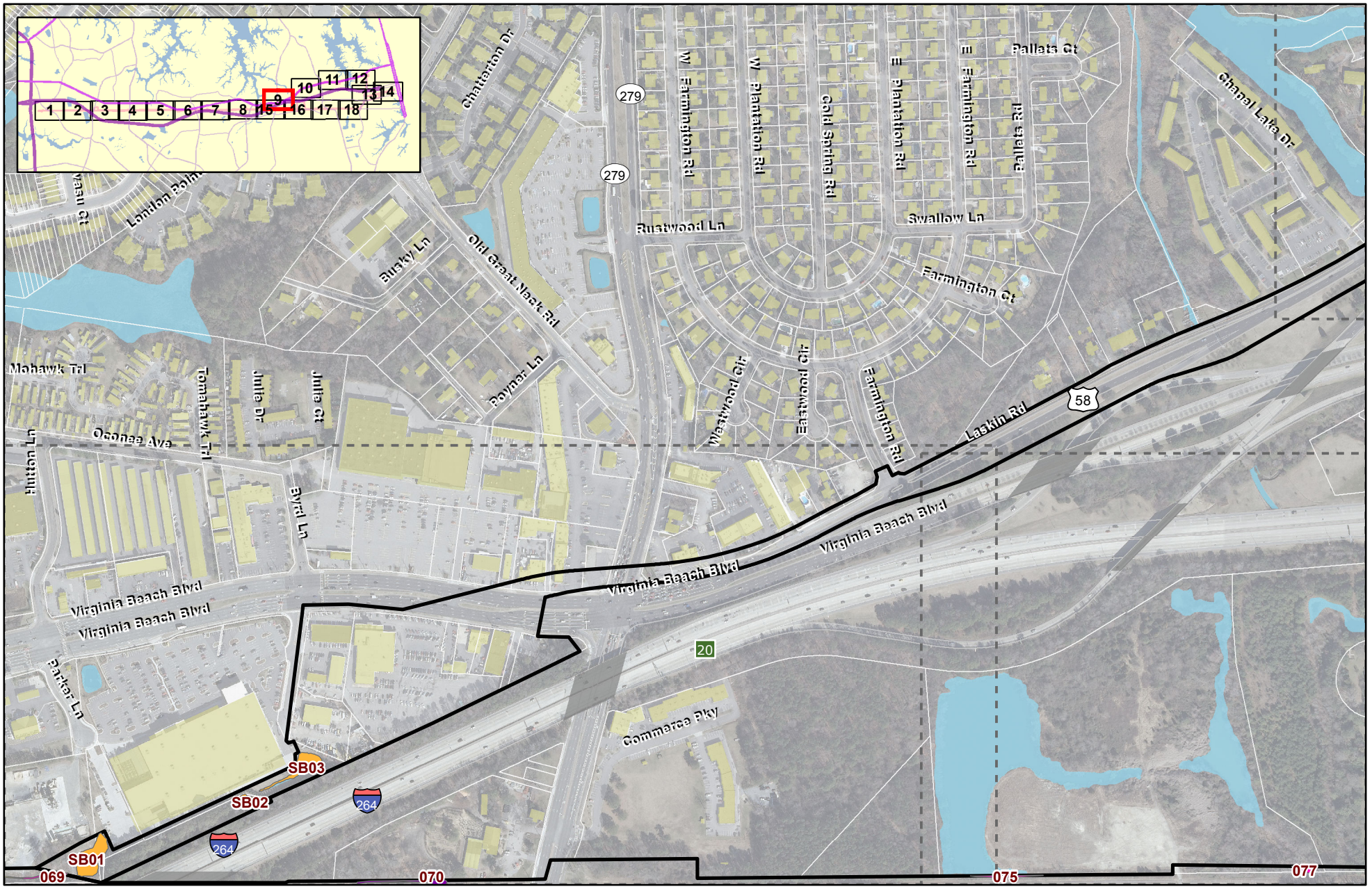
- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

Match Line

- Match Line



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 9

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

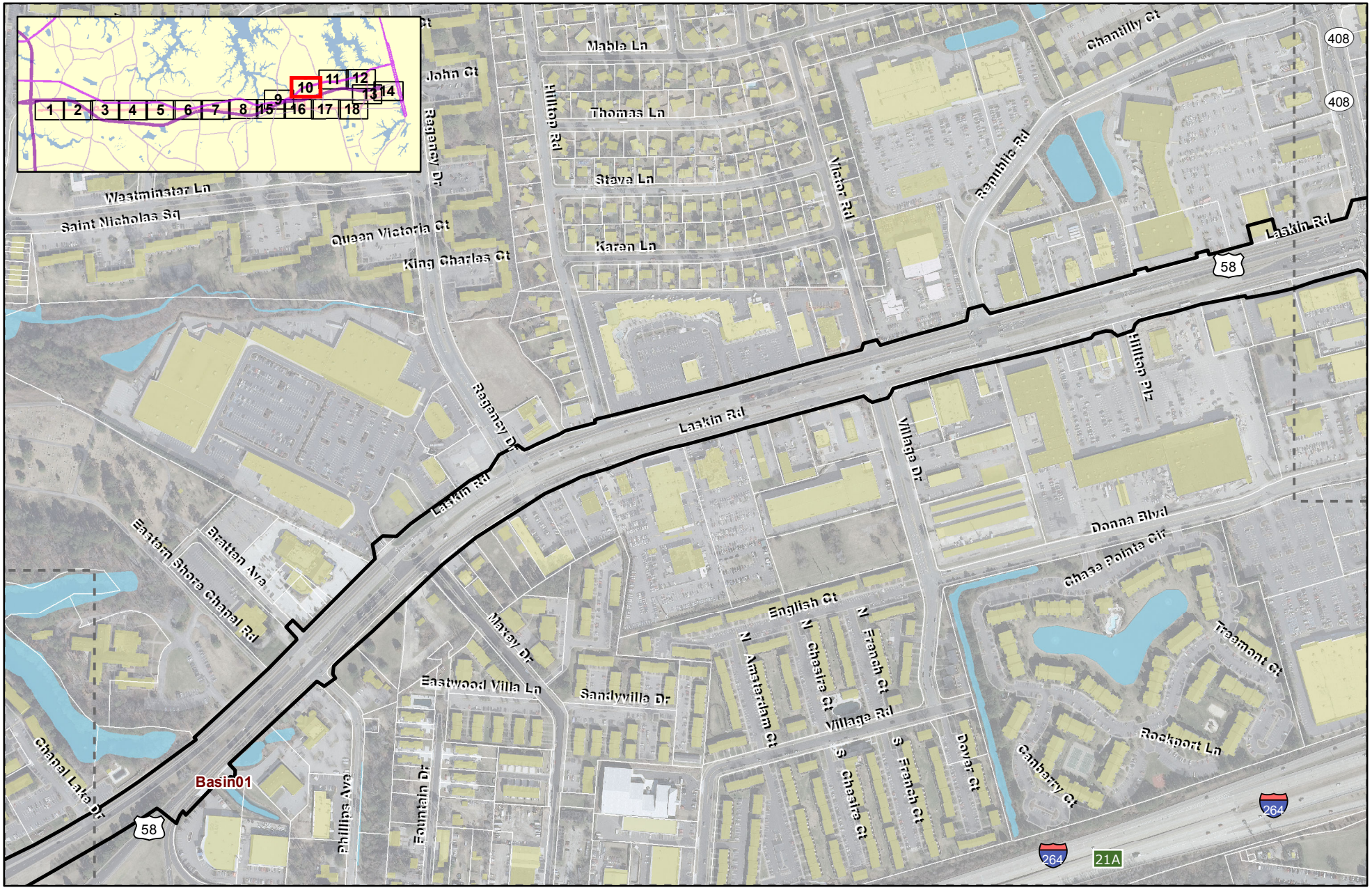
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 10

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

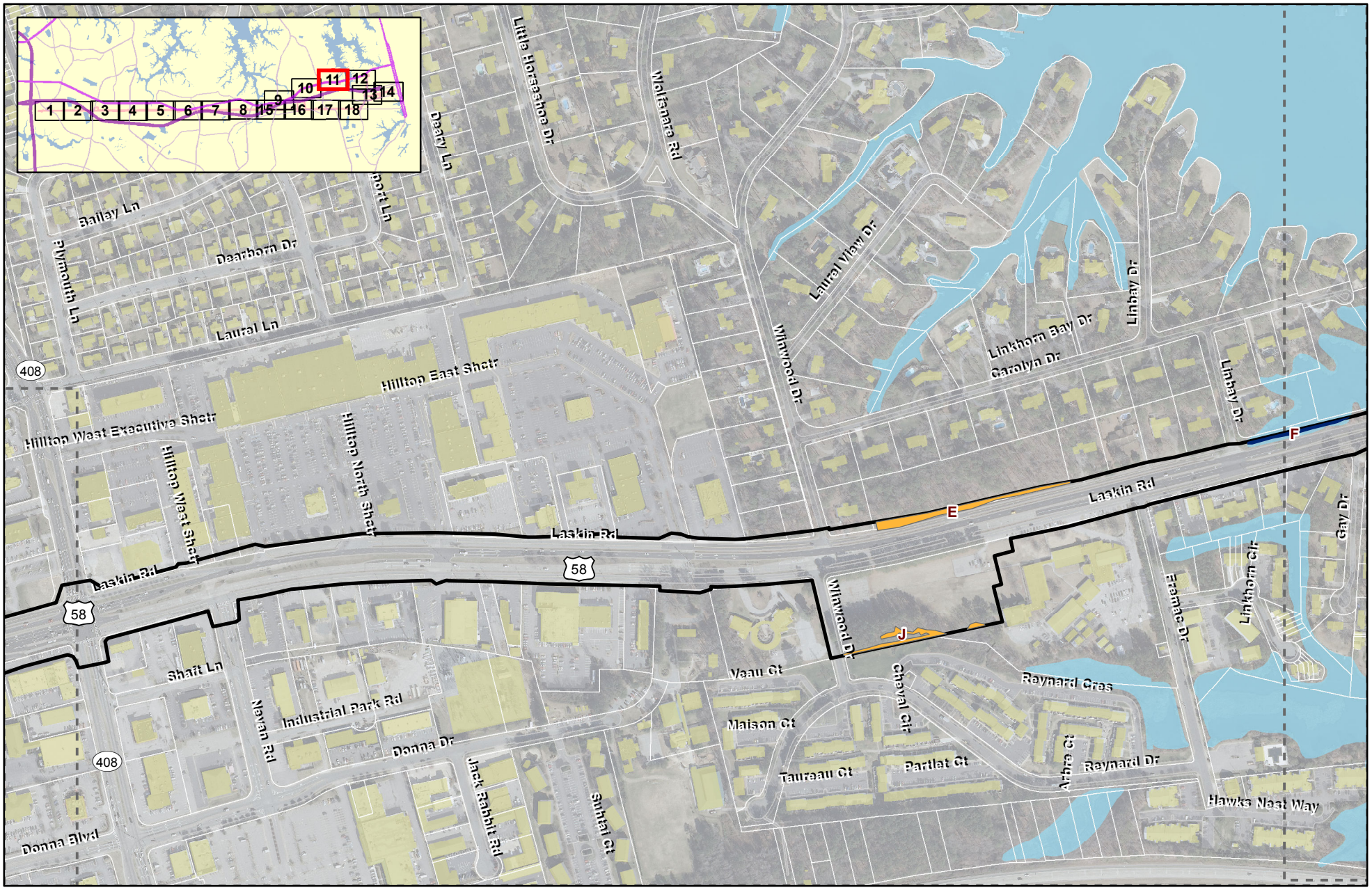
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 11

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

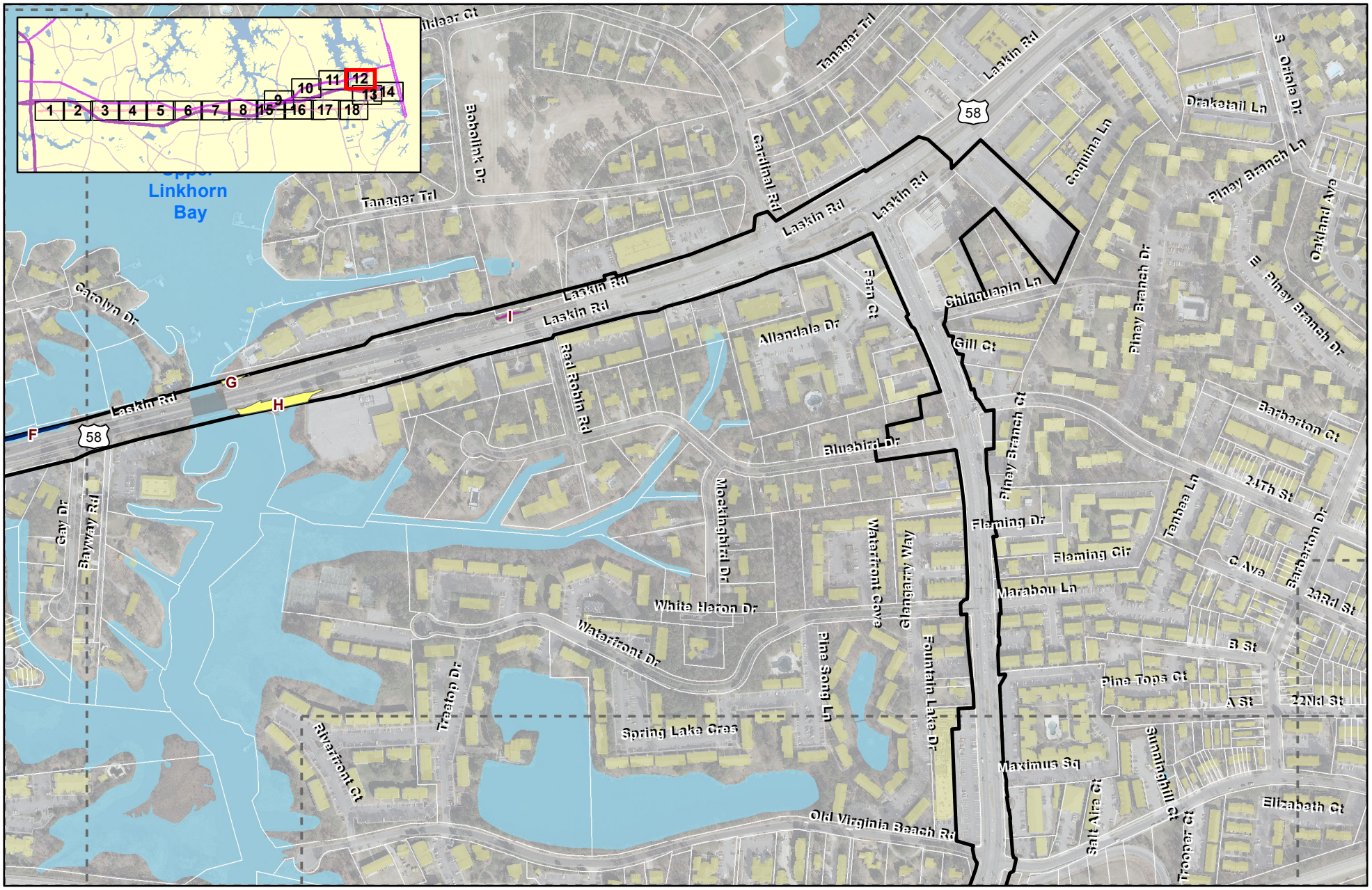
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 12

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

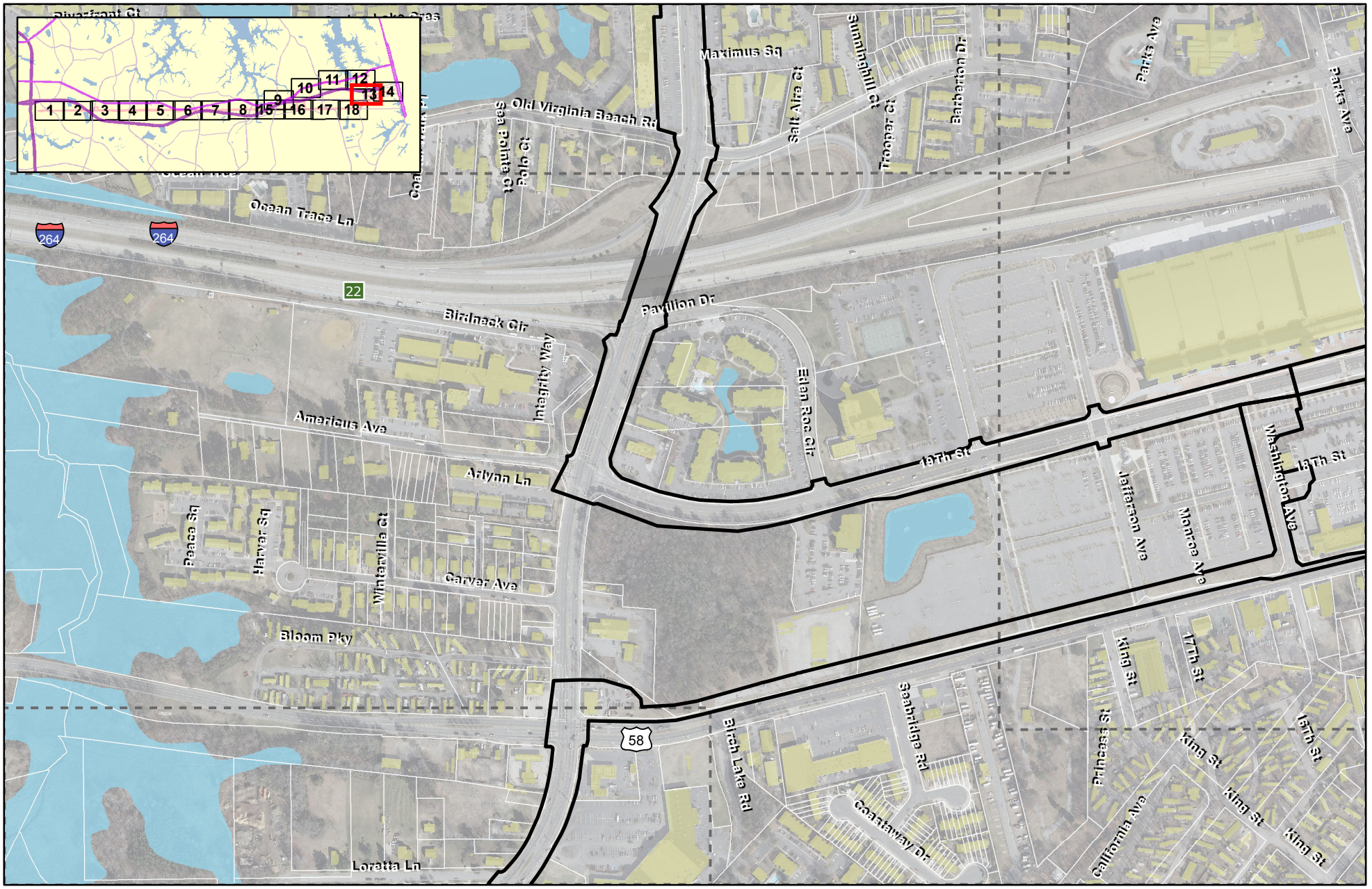
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 13

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

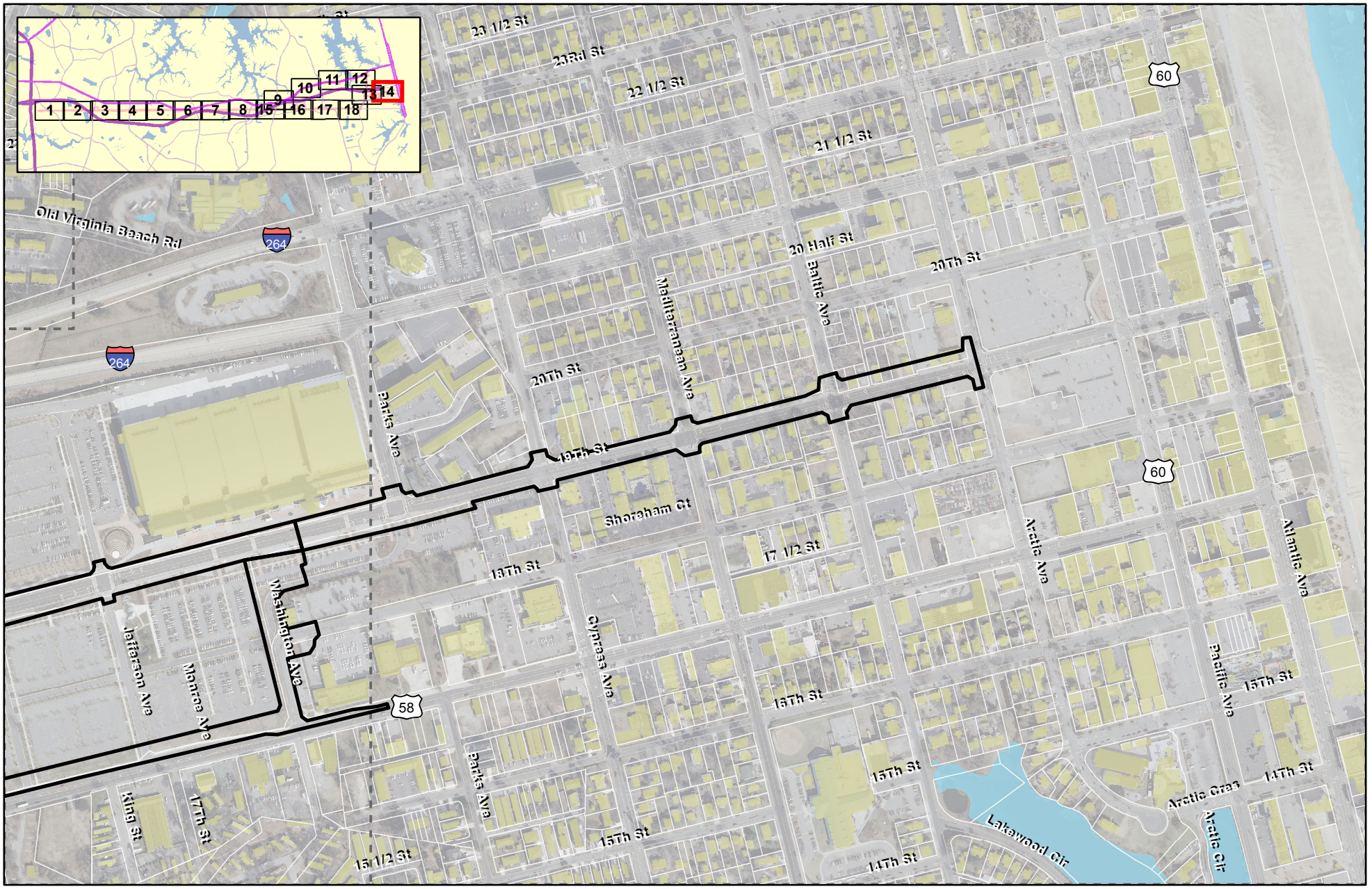
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 14

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

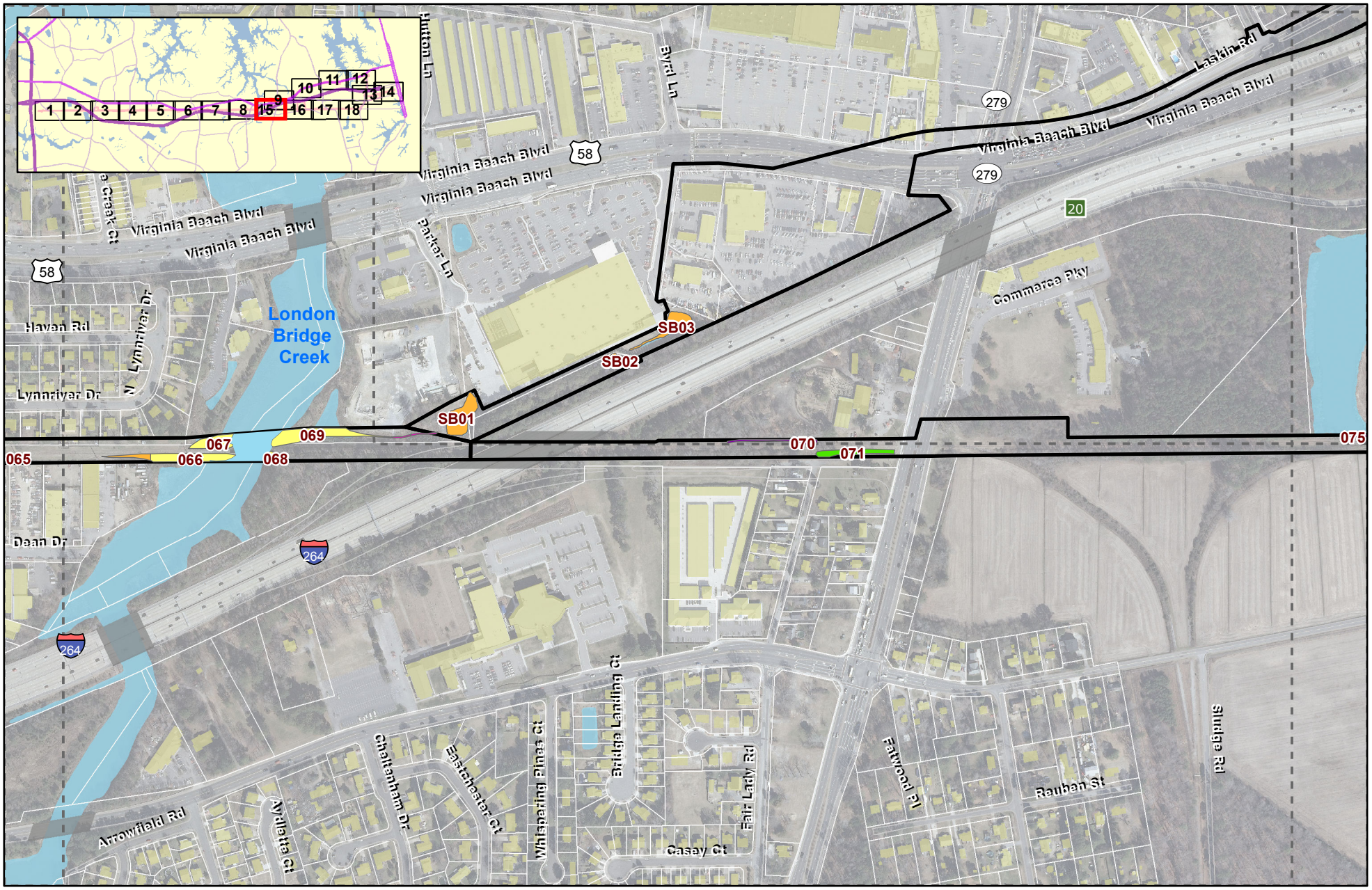
- Limit of Disturbance

Match Line

- Match Line

0 100 200 300 400 Feet

N



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 15

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014

Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 16

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014

Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 17

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

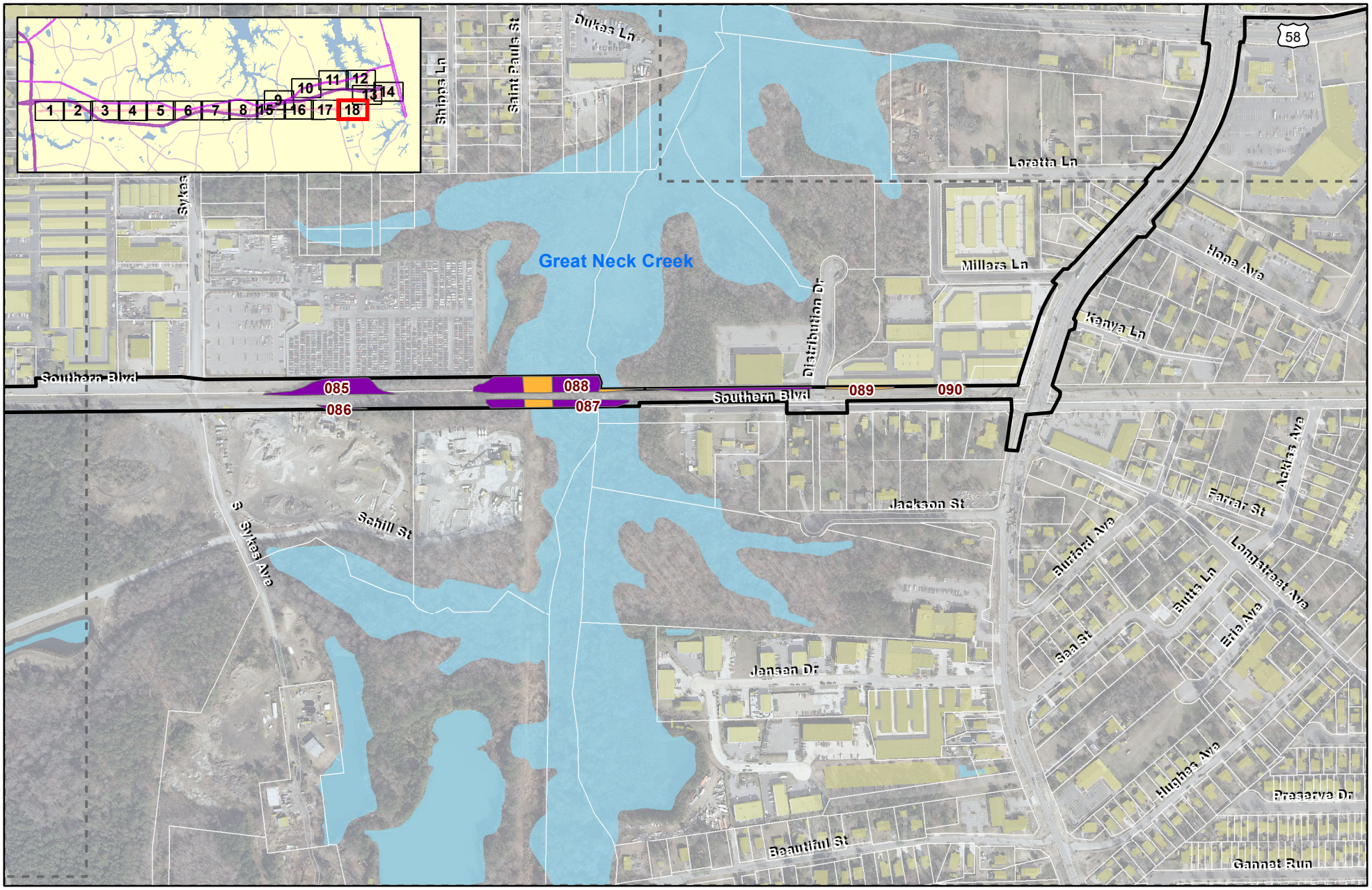
Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014



Virginia Beach Transit Extension Study

Wetlands Field Investigation Maps Sheet 18

Cowardin Classification

- PUB/PFO/PSS
- E2EM
- PEM
- PFO
- PFO/PSS
- PSS/PEM
- Open Water

Limit of Disturbance

- Limit of Disturbance

Match Line

- Match Line

0 100 200 300 400 Feet

N

Original in Color - FHI - 9/25/2014